metals review

the news digest magazine

published by the american society for metals

Volume XXVI - No. 9 September, 1953

TYPE 401-4
Marquenching-Austempering Unit

TYPE 701-4
Submerged Electrode Furnace
with removable electrodes.

BORON STEEL

Second Revised Edition, 1953 — Ernest E. Thum, *Editor*

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$1.00 per Copy

American Society for Metals
7301 Euclid Ave., Cleveland 3, Ohio

Metals Review

THE NEWS DIGEST MAGAZINE • VOLUME XXVI, No. 9 September, 1953

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ASM REVIEW OF METAL LITERATURE

NATIONAL METAL EXPOSITION

THE BIG METAL SHOW

Champion — in the Metals Market Place of the World!

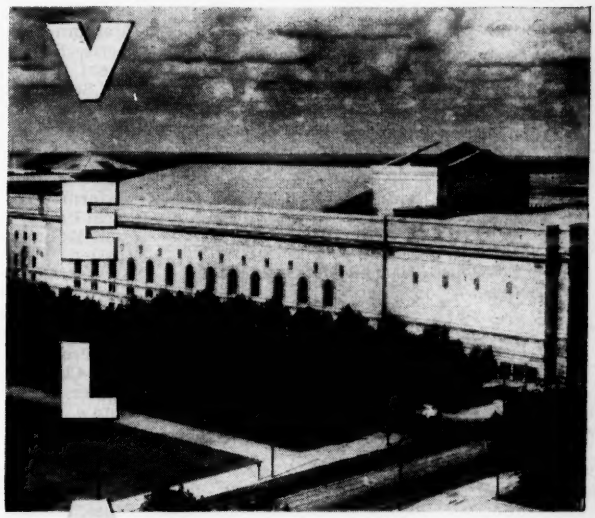
Unmatched anywhere in the world for intensity of interest . . . for wealth of ideas and basic appeal . . . the National Metal Exposition in Cleveland's Public Hall this October, will be host to another record-breaking audience of metals industries people . . . intent upon seeing the newest . . . the finest . . . the most wanted developments America's industrial genius has created. For every man interested in metals, this champion of all industrial expositions offers *more of everything!*

NATIONAL METALS EXPOSITION

NATIONAL METAL CONGRESS

CLEVELAND, OHIO • OCTOBER 19-23

Convention in



CLEVELAND, 1953 host to the National Metal Congress and Exposition, is the capital of a great trade empire, an industrial giant ranking among the greatest in the world. The city, noted as a cosmopolitan community because of its heterogenous population, is largely industrial in character, with emphasis on steel and parts manufacturing. It has come to be known as the "best location in the nation" because of the advantages of its location in the market center of the United States. Neither East nor yet Middle West, Cleveland faces both ways and is the gateway to each of the other directions. Half of the population of America is within a 500-mile radius and overnight rail time of the city.

The city, the seventh largest in the country with a population of well over a million, offers all the attractions of a great metropolis. Its cultural and educational institutions, parks and entertainment facilities, are all available for extracurricular activities and are conveniently located in or near the heart of the city, the Public Square. All major hotels, the shopping district, transportation points, amusements and the Public Auditorium are within walking distance of each other, and any point in or near the city within easy access of the downtown area.

The Public Auditorium, site of this year's Metal Show, is located on the Mall, which overlooks Lake Erie and extends into the business district. Famous for its unique facilities and capacity, the Auditorium is considered to be one of America's finest and most serviceable municipal meeting places.

Heart of Downtown Cleveland
The Public Auditorium
The Terminal Tower From the Flats

(Photos: Cleveland Convention Bureau)

American Society for Metals

Technical Program
National Metal Congress
Cleveland, Oct. 19-23, 1953

SEMINAR ON RELATION OF PROPERTIES TO MICROSTRUCTURE

(Ballroom, Hotel Statler)

Saturday, Oct. 17

9:30 a.m.

Chairman: Bruce Chalmers, Harvard University.

Structure and Structure Sensitive Properties, by J. H. Hollomon, General Electric Research Laboratory.

Effect of Grain Boundaries on Mechanical Properties, by M. Gensamer, Columbia University.

Principles of Solution Hardening, by E. R. Parker and T. Hazlett, University of California.

2:00 p.m.

Chairman: Morris Cohen, Massachusetts Institute of Technology.

Effect of Dispersion on Mechanical Properties, by J. E. Dorn and C. D. Starr, University of California.

Theory of Dispersion Hardening, by E. W. Hart, General Electric Research Laboratory.

Structure and Alloy Design, by A. D. Schwope, Battelle Memorial Institute.

8:00 p.m.

Chairman: John C. Fisher, General Electric Co.

Interaction of Dislocations With Solute Atoms, by A. H. Cottrell, University of Birmingham, Birmingham, England.

Sunday, Oct. 18

9:30 a.m.

Chairman: Oscar T. Marzke, Naval Research Laboratory.

Relation of Fracture to Microstructure, by J. R. Low, General Electric Research Laboratory.

Strength of Glass-Reinforced Structures, by G. Slayter, Owens-Corning Fiberglas Corp.

Relation of Corrosion to Microstructure, by H. H. Uhlig, Massachusetts Institute of Technology.

2:00 p.m.

Chairman: Paul A. Beck, University of Illinois.

Theory of the Relation of Magnetic Properties to Microstructure, by L. J. Dijkstra, Westinghouse Research Laboratories.

Structure and Coercivity, by J. Libsch and G. Conard, Lehigh University.

Monday, Oct. 19

9:30 a.m.

TITANIUM AND MOLYBDENUM

Determination of Oxygen in Titanium and Zirconium by the Isotopic Method, by A. D. Kirshenbaum, R. A. Mossman and A. V. Grosse, Research Institute of Temple University.

Vacuum-Fusion Analysis of Molybdenum, by M. W. Mallett, Assistant Supervisor, Thermal Chemistry Group, and C. B. Griffith, Battelle Memorial Institute.

Nitriding of Titanium With Ammonia, by J. L. Wyatt, Assistant to Technical Manager, Horizons, Inc., and N. J. Grant, Massachusetts Institute of Technology.

Heat Treatment of High-Strength, Titanium-Base Alloys, by W. M. Parris, Engineer, P. D. Frost, Assistant Supervisor, and J. H. Jackson, Supervisor, Battelle Memorial Institute.

2:00 p.m.

TITANIUM

Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Molybdenum Alloys, by H. D. Kessler, Supervisor, Nonferrous Metals Research, and M. Hansen, Chairman, Metals Research, Armour Research Foundation.

Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Chromium Alloys, by H. D. Kessler, Supervisor, Nonferrous Metals Research, and M. Hansen, Chairman, Metals Research, Armour Research Foundation.

Isothermal Transformation of Titanium-Manganese Alloys, by P. D. Frost, Assistant Supervisor, W. M. Parris and L. L. Hirsch, Research Engineers, Nonferrous Metallurgy, J. R. Doig, Research Engineer and C. M. Schwartz, Supervisor, Physics Div., Battelle Memorial Institute.

Correlation Between Heat Treatment, Microstructure and Mechanical Properties of Titanium-Molybdenum Alloys, by D. J. DeLazaro, Assistant Metallurgist, and W. Rostoker, Senior Metallurgist, Metals Research Department, Armour Research Foundation.

Tuesday, Oct. 20

9:30 a.m.

MECHANICAL

Transverse Mechanical Properties of Slack-Quenched and Tempered Wrought Steel, by John Vajda and Paul E. Busby, Carnegie Institute of Technology.

A Time-Temperature Relationship for Recrystallization and Grain Growth, by F. R. Larson and J. Salmas, Physical Metallurgists, Watertown Arsenal Laboratory.

Effect of Non-Martensite Decomposition Products on the Properties of Quenched and Tempered Steels, by E. F. Bailey, Metallurgist, Naval Research Laboratory.

The Effect of Inclusions on the Fatigue Strength of SAE-4340 Steels, by J. T. Ransom, E. I. du-Pont deNemours & Co.

NONFERROUS

The System Zirconium-Aluminum, by D. J. McPherson, Supervisor, Physical Metallurgy, and M. Hansen, Chairman, Metals Research, Armour Research Foundation.

Observations on the Behavior of Hydrogen in Zirconium, by C. M. Schwartz and M. W. Mallett, Battelle Memorial Institute.

Recrystallization Applied to Control of the Mechanical Properties of Molybdenum, by J. H. Bechtold, Westinghouse Electric Corp.

2:00 p.m.

PHYSICAL METALLURGY

Supercooling and Dendritic Freezing in Alloys, by W. C. Winegard and B. Chalmers, University of Toronto.

Another Look at Quenchants, Cooling Rates and Hardenability, by D. J. Carney, Chief Development Metallurgist, United States Steel Corp., South Works.

The Effect of Pearlite Spacing on Transition Temperature of Steel at Four Carbon Levels, by J. A. Rinebolt, Metallurgist, Naval Research Laboratory.

Elevation of Critical Temperatures in Steel by High Heating Rates, by W. J. Feuerstein, Metallurgist, and W. K. Smith, Head, Metallurgy Section of Materials Evaluation Branch, U. S. Naval Ordnance Test Station.

Wednesday, Oct. 21

9:00 a.m.

ASM ANNUAL MEETING

Campbell Memorial Lecture

Behavior of Metals under Dynamic Loadings, by Donald S. Clark, California Institute of Technology.

2:00 p.m.

BORON

A Hypothesis for the Boron Hardenability Mechanism, by J. W. Spret-

nak and Rudolph Speiser, Associate Professors, Department of Metallurgy, Ohio State University.

The Effect of Boron on Notch Toughness and Temper Embrittlement, by A. E. Powers and R. G. Carlson, Turbine Div., General Electric Co.

A Study of the Fe-Fe$_2$B System, by C. C. McBride, E. I. duPont Co., Savannah River Plant, and J. W. Spretnak and Rudolph Speiser, Associate Professors, Department of Metallurgy, Ohio State University.

The Carbonitriding of Boron Steels, by G. W. Powell, M. B. Bever and C. F. Floe, Massachusetts Institute of Technology.

Thursday, Oct. 22

9:30 a.m.

TEMPERING

The Effect of Silicon on the Kinetics of Tempering, by W. S. Owen, University of Liverpool, England.

Microstructural Changes on Tempering Iron-Carbon Alloys, by B. S. Lement, B. L. Averbach and M. Cohen, Massachusetts Institute of Technology.

Effect of Chemical Composition on Susceptibility of Steels to Temper Brittleness, by Ralph Hultgren, Professor of Metallurgy and John Chuan Chang, University of California.

The Embrittlement of Alloy Steel at High Strength Levels, by L. J. Kingler, W. J. Barnett, R. P. Frohmberg and A. R. Troiano, Department of Metallurgical Engineering, Case Institute of Technology.

Thursday, Oct. 22

9:30 a.m.

CONSTITUTION

Equilibrium Structures in Fe-Cr-Mo Alloys, by J. G. McMullin, S. F. Reiter and D. G. Ebeling, Research Laboratory, General Electric Co.

A Survey of Vanadium Binary Systems, by W. Rostoker, Senior Metallurgist and A. Yamamoto, Armour Research Foundation.

Gamma Loop Studies in the Iron-Vanadium and the Iron-Vanadium-Titanium Systems, by W. R. Lucas, Graduate Student and W. P. Fishel, Professor of Metallurgy, Vanderbilt University.

2:00 p.m.

STAINLESS and HIGH SPEED

High-Temperature Transformations in Ferritic Stainless Steels Containing 17 to 25% Chromium, by A. E. Nehrenberg, Supervisor, Research Lab., and Peter Lillys, Research Metallurgist, Crucible Steel Co. of America.

Intergranular Corrosion of Ferritic Stainless Steels, by R. A. Lula, A. J. Lena, and G. C. Kiefer, Allegheny Ludlum Steel Corp.

Grain Growth in High Speed Control, by Eric Kula and Morris Cohen, Department of Metallurgy, Massachusetts Institute of Technology.

Discontinuous Grain Growth in High Speed Steel, by A. H. Grobe, Research Metallurgist, G. A. Roberts, Chief Metallurgist, and D. S. Chambers, Vanadium-Alloys Steel Co.

Friday, Oct. 23

9:30 a.m.

MECHANICAL

Strain Aging Behavior of Rheotropically Embrittled Steel, by E. J. Ripling, Dept. of Metallurgy, Case Institute of Technology.

Flow and Fracture of Single Crystals of High-Purity Ferrites, by R. P. Steijn, Assistant Professor, Rice Institute, and R. M. Brick, Professor, University of Pennsylvania.

Notched Bar Tensile Properties of Various Materials and Their Relation to the Unnotch Flow Curve and Notch Sharpness, by Harry Schwartzbart, Armour Research Foundation, and W. F. Brown, Jr., National Advisory Committee for Aeronautics.

Effect of Some Solid Solution Alloying Elements on the Creep Parameters of Nickel, by Thomas Hazlett, Research Engineer, and Earl R. Parker, University of California.

THREE A.S.M. LECTURE COURSES

Monday, Oct. 19

SURFACE PROTECTION AGAINST WEAR

4:30 p. m.

Techniques Selection, by Howard S. Avery, Research Metallurgist, American Brake Shoe Co.

Electroplates and Anodizing, by J. M. Hosdowich, United Chromium, Inc.

Case Hardening, Diffusion Coatings, and Selective Heat Treatment, by Michael B. Bever, Massachusetts Institute of Technology.

Metal Spraying, by Howard Vanderpool, Metallizing Engineering Co., Inc.

8:00 p. m.

Hard Facing and Abrasion Resistant Alloys, by Howard S. Avery, Research Metallurgist, American Brake Shoe Co.

Practical Examples of Surface Protection, by Theodore Gaynor, Bethlehem Steel Co.

Summary and Discussion, by Howard S. Avery.

Tuesday, Oct. 20

SURFACE PROTECTION AGAINST CORROSION

4:30 p. m.

Economic Factors of Atmospheric Corrosion Versus Protection, by Clarence C. Harvey, Ethyl Corp.

Surface Preparation and Pre-Treatment, by A. J. Liebman, Assistant Director, Research & Development Dept., Dravo Corp.

Organic Coatings for Normal Service, by Arnold J. Eickhoff, National Lead Co.

Organic Coatings for Severe Service, by Kenneth Tator, Kenneth Tator Associates.

8:00 p. m.

Specifications for the Painting of Metals, by Joseph Bigos, Director of Research, Steel Structures Painting Council.

Cathodic Protection and Galvanizing, by H. A. Robinson, Chief, Chemical Section, Metallurgical Laboratories, Dow Chemical Co.

Metallizing, by H. S. Ingham, Metallizing Engineering Co., Inc.

Electrodeposited Coatings, by Fielding Ogburn, Chemist, National Bureau of Standards, Electrodeposition Section, Division of Chemistry.

Wednesday, Oct. 21

FATIGUE

4:30 p. m.

Basic Concepts of Fatigue Damage in Metals, by T. J. Dolan, Research Professor of Theoretical and Applied Mechanics, University of Illinois.

Fatigue Failure Under Resonant Vibration Conditions, by B. J. Lazan, Director of Engineering Experiment Station, University of Minnesota.

8:00 p. m.

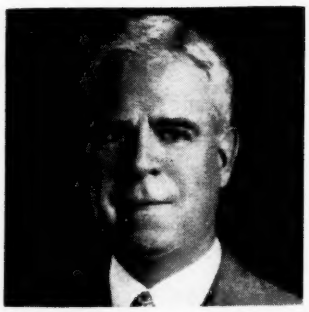
Fatigue Characteristics of Large Sections, by O. J. Horger, Chief Engineer, Timken Roller Bearing Co.

A. E. White Elected to ASM Honorary Membership

The highest recognition that the American Society for Metals can confer upon any of its members has been awarded to Albert Easton White with his election as an honorary member of the Society. During the Society's entire history only eighteen honorary members have been named, and of these only seven are still living.

Professor White began his terminal leave from University of Michigan on July 1 of this year, after 33 years as director of the Engineering Research Institute. His first job upon graduation from Brown University with an A. B. degree in 1907 (in 1925 he received an honorary D.Sc. degree from Brown) was as a research engineer at Jones & Laughlin Steel Co. in Pittsburgh. Here it was that he became primarily interested in metallurgy, then a relatively new science, only lately divorced from chemistry.

In 1911 he left Jones & Laughlin to come to the University of Michigan as instructor in the department of chemical and metallurgical engineering. From then on his teaching and research career at the University has been interrupted only twice. During World War I, 1917 to 1919, he worked in the inspection division of the Ordnance Department of the United States Army, eventually becoming head of the entire inspection division and head of the metallurgical branch of the technical staff. White attained the rank of Lieutenant Colonel in the Army Ordnance Reserve Corps when he returned to civilian life. During World War II he served his country again as a specialist in metallurgy.



A. E. White

He was chairman of the Metallurgical Committee of the National Defense Research Committee, 1940-41, and a member of the Metallurgical Committee of the Office of Scientific Research and Development, 1942-46.

When Professor White returned to the University of Michigan after World War I at the age of 35, he was appointed a full professor, skipping the rank of associate professor. The department of engineering research was established at University of Michigan in 1920 with White as its director. Service to industry was the primary principle underlying the establishment of the Institute, although service to the community and the University has since become of equal importance. In 1951-52 the Institute's research amounted to $6,500,000, and during the current year it is expected to be in the neighborhood of $9,000,000.

Professor White's primary interest over many years has lain largely in the field of high-temperature properties of metals. He initiated the development of low alloy steels for high-temperature service, suggested alloys that would overcome graphitization in pipe lines, and has worked on the development of alloys for services at temperatures up to 2000° F., now so important in the operation of jet-driven propellers and planes.

One of the most important of Professor White's accomplishments has to do with the early history of the American Society for Metals. It was primarily through his efforts that the American Society for Steel Treating (early name of the ASM) came into being in 1920. During the war years of 1917 through 1919 two independent heat treating associations sprang up known as the American Steel Treaters Society, with headquarters in Chicago, and the Steel Treating Research Society, with headquarters in Detroit. Professor White, aware of the futility of these divided efforts, succeeded in bringing together representatives of both organizations and devising a satisfactory amalgamation procedure. He served as the first president of the new society in 1920-21.

White is also an ex-president of the American Society for Testing Materials, a past-manager and a fellow of the American Society of Mechanical Engineers, and a member of several other engineering and professional societies. Lately he has been made an honorary life member of the American Ordnance Association of which he is a charter member.

25-Year Member Sums Up A.S.M. Associations

Gerald A. Lux of the New York Chapter summed up the benefits he has derived from the American Society for Metals in a letter of thanks for his 25-year membership certificate in the following words:

"As I look back over the years, I am more and more conscious of the benefits that assoc'ation with the A.S.M. has provided. From the very first meeting of the American Society for Steel Treating that I attended, the Society has helped me. I had been given an assignment to investigate the desirability of using zinc-base die castings in equipment manufactured by my employer, the General Railway Signal Co. I wasn't having much success in getting factual data. Accidentally, I noticed that the American Society for Steel Treating was having Sam Tour give a talk on 'Zinc-Base Die Castings' before the Rochester Chapter. I attended that meeting as a guest, but voluntarily left as a member of the Rochester Chapter.

"I was actively associated with the Rochester Chapter for a dozen or more years and admit that I gave it a lot of my time and efforts. However, I can honestly say that, just as in the case of our dues in the A.S.M., every bit of my efforts was returned many times in good fellowship, technical advice and assistance in solving problems, both from fellow members and the publications of the Society.

"Pressure of other duties and a change of interest have not enabled me to be as active in the affairs of the Society since I left the Rochester Chapter. Nevertheless, I shall always continue my membership and attend the local chapter meetings when possible."

Mr. Lux is director of technical information of Oakite Products, New York, and is a past chairman of the Rochester Chapter.

Annual Meeting For A.S.M. Members

This is your official notice that the annual meeting of the American Society for Metals will be held in the Hotel Statler, Cleveland, on Wednesday morning Oct. 21, 1953. All members of the Society in good standing are privileged to attend and vote.

W. H. EISENMANN, Secretary
Cleveland, Ohio
September 1, 1953

Speakers Available

The Westinghouse Electric Corp. has announced that the name of R. R. LaPelle, advisory engineer at the Meadville, Pa., plant, has been added to the list of speakers available to talk before A.S.M. chapter meetings. Mr. LaPelle has a broad background of design and application experience on heat treating furnaces for the brass and aluminum industries. He also lectures on fuel-fired and electric furnace applications and design and has available a set of slides to illustrate his talk.

Toledo Officer Drowns

Robert W. Furman, Jr., vice-chairman of the Toledo Chapter A.S.M. during the 1952-53 season, drowned while saving his son from drowning at a beach near Port Clinton, Ohio. Mr. Furman was a sales engineer for North American Mogul Products Co.

A. S. M. Teaching Awards to Zmeskal, Schlechten and Armstrong

Awards of $2000 each will be made to Otto Zmeskal, chairman, department of metallurgical engineering, Illinois Institute of Technology, Albert W. Schlechten, professor of metallurgical engineering, Missouri School of Mines and Metallurgy, and William M. Armstrong, associate professor of metallurgy, University of British Columbia. The awards will be made during the A.S.M. annual meeting in Cleveland, Ohio.

Established in 1952 by action of the Board of Trustees of the American Society for Metals, the purpose of the $2000 Awards for Teachers of Metallurgy is to recognize outstanding leadership in the classroom and the laboratory, and in a measure reward this great profession by wider acceptance and prestige so greatly needed by outstanding teachers.

The Awards were set up also as a stimulus to students who are already in metallurgy, and students who are potential candidates for degrees in this subject. By following these objectives, the Society hopes to increase metallurgical enrollment of qualified students.

The candidates for the Awards must be under 40 years of age. They must have sound knowledge of and enthusiasm for their subject, and must have demonstrated their ability to impart that knowledge and enthusiasm to their students.

Otto Zmeskal

Otto Zmeskal, a native of Illinois, graduated from Armour Institute of Technology in 1936 with a B.S. degree. Before entering the teaching profession he was employed by the Carnegie-Illinois Steel Corp. in Chicago, but returned to Armour Institute as an instructor in metallurgy while doing postgraduate study and research.

After receiving his M.S. degree in 1938, he spent three years at Massachusetts Institute of Technology as a teaching assistant, and studying under Professor Morris Cohen for his Sc.D. degree, which he was granted in 1941. For the next two years he served as assistant professor at Illinois Institute of Technology (formerly Armour Institute), and the following two years he was a member of the research staff of Universal-Cyclops Steel Corp., becoming director of research in 1945. In 1946 he was recalled to Illinois Institute to become professor of metallurgy and chairman of the newly established department of metallurgical engineering. He has held this position since that time.

Dr. Zmeskal's qualifications were well documented by evidence from both faculty associates and former students. His programming of studies has been notable for its practical adaptation to the needs of both industry and the teaching profession.

Albert W. Schlechten

Dr. Schlechten is a native of Montana and graduated from Montana School of Mines with a B.S. degree in metallurgical engineering. He did postgraduate work and research study at Massachusetts Institute of Technology where he was awarded the Sc.D. degree in 1940.

His outstanding career as a teacher was supplemented by three years of practical experience outside the classroom. In 1941 he was research engineer for the Anaconda Copper Mining Co. From 1944 to 1946 he was a member of the metallurgical staff at the U. S. Bureau of Mines.

Dr. Schlechten has had a broad and thorough career as a teacher. From 1937 to 1940 he was graduate assistant at M.I.T.; from 1940 to 1941 he was an instructor in metallurgy, University of Minnesota, and was made assistant professor in 1941. From 1942 to 1944 he was associate professor of mining and metallurgy at Oregon State College. Since 1946 he has been professor of metallurgical engineering at Missouri School of Mines and Metallurgy.

In addition to his high qualifications in metallurgical engineering, Dr. Schlechten has built up the teaching staff at Missouri to a point of great efficiency and high standards.

The success of his students and the high praise of his associates attest to his outstanding qualifications as a teacher.

William M. Armstrong

William Armstrong is a native of Ontario, Canada, and an honor graduate in chemical engineering from the University of Toronto. Immediately after graduation he joined the Steel Co. of Canada, Ltd., and for nearly five years held various plant positions leading to assistant open hearth and rolling mill metallurgist. In 1941 he was made supervisor of the metallurgical laboratory, in charge of all physical testing and metallurgical investigation. In 1943, he was appointed research director for the Ontario Research Foundation. During the war he was particularly concerned with melting practices, fabrication of brass cartridge cases, cladding and coating of precious metals, and development of steels for armor-piercing shot.

For two years (1944-1946), he was research fellow for Dominion Foundries and Steel Co. Ltd., his duties chiefly concerned with foundry practice. In 1946 he devoted considerable time to preliminary work on a foundry experimental station for the British Columbia Research Council.

Since 1946 Professor Armstrong has been associate professor of metallurgy at the University of British Columbia.

His competence as a teacher is attested to by the records of students who have taken his course and by his recognition in the curriculum and other committees of the University.

Clark to Present Campbell Lecture

One of the highlights of the annual Metal Congress is the presentation of the Edward de Mille Campbell Memorial Lecture, heard each year at the annual meeting of the ASM.

This year's Campbell Lecture will be presented on Oct. 21 by Donald S. Clark, professor of mechanical engineering at the California Institute of Technology.

He is a leading authority on physical metallurgy, and an outstanding teacher in the fields of metallurgy and physics.

Professor Clark is a native of Massachusetts, and received his B.S. degree in engineering at the California Institute of Technology in 1929 and his M.S. degree in 1930.

His professional experience includes an assistant professorship in engineering at the California Institute of Technology, 1929 to 1930, and he was a fellow in mechanical engineering from 1930 to 1934. His advancement at California Institute has been steady and marked by a distinguished record of teaching accomplishment.

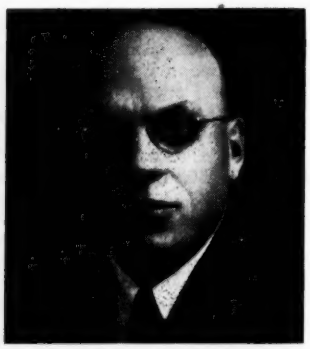
The 1953 Campbell Lecturer has had wide experience in research activities, including investigations into the properties of silver and silver alloys, dynamic properties of metals and alloys, fluoroscopic inspection of metals and alloys, and many other war production activities, naval research, and ordnance.

Donald S. Clark

A degree of Ph.D. was awarded Professor Clark in 1934 while he was an instructor in mechanical engineering at California Institute of Technology.

Professor Clark is a former National Trustee of the American Society for Metals, and was Chairman of the Los Angeles Chapter from 1936 to 1937.

Sauveur, Gold and Research Medal Winners



William T. Ennor
Sauveur Award

Sauveur Achievement Award

William T. Ennor, assistant director of research, Aluminum Research Laboratories, Aluminum Co. of America, is the 1953 winner of the Albert Sauveur Achievement Award, presented by the American Society for Metals.

The Award was established in 1934 in honor of Dr. Albert Sauveur, late Harvard University Professor, widely known as the "Dean of American Metallurgists".

The 1953 Sauveur Medalist is one of the country's outstanding authorities on nonferrous metals, having developed for large scale production use the D. C. (directly chilled) ingot. Mr. Ennor has also made practical contributions in the fields of rolled forging stock and structural shapes, as well as improvements in conductor wire, Alclad wire, and aluminum screen cloth.

The Sauveur Medalist for 1953 holds many patents on the processing of aluminum and its alloys. He is a graduate of the University of Wisconsin where he taught as an instructor immediately after graduation. He joined the Aluminum Co. of America in 1924.

Gold Medal Award

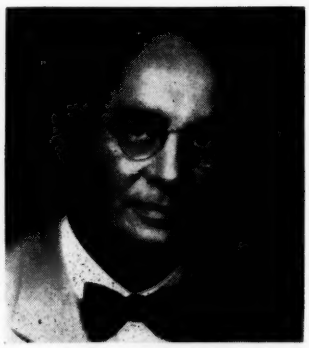
George Sachs, director of metallurgical research, Institute of Industrial Research, Syracuse University, has been chosen to be the 1953 recipient of the American Society for Metals' Gold Medal Award.

Dr. Sachs, a native of Russia, was educated in Germany. He received his B.Sc. degree in civil engineering, and his D. Eng. degree in mechanical engineering from the Berlin Engineering School.

Presentation of the ASM Gold Medal to Dr. Sachs will be made at the annual dinner of the American Society for Metals to be held in the Grand Ballroom of Cleveland's Hotel Statler on Thursday evening, Oct. 22, 1953.

The Gold Medal of the American Society for Metals was established in 1943 to recognize outstanding metallurgical knowledge and exceptional ability in the diagnosis and solution of diversified metallurgical problems.

Dr. Sachs is one of the country's leading authorities on diffraction analysis and has contributed greatly to the advancement of methods covering flow, stress, deep drawing, and crystallography. He was professor-lecturer on the physics of metals at Frankfort University in Germany, and has also been associated with the Berlin Engineering School, the Kaiser Wilhelm Institute for Metals Research, as well as director of metals research at Frankfort's Metallgesellschaft, and vice-president of development and research at Duerener Metallwerke.



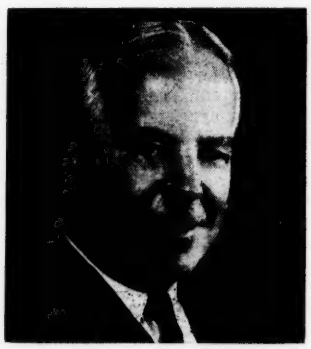
George Sachs
Gold Medal

Dr. Sachs has had many important assignments as special consultant. He has held the position of director of metallurgical research at Syracuse University since 1952.

ASM Medal for the Advancement of Research

The ASM Medal for the Advancement of Research will be presented to Hiland Garfield Batcheller, chairman of the board of Allegheny-Ludlum Steel Corp., at the annual banquet of the American Society for Metals on Oct. 22, 1953, during the 35th National Metal Congress and Exposition in Cleveland.

Founded by the American Society for Metals in 1943, the Medal is based upon these qualifications: "The candidate shall be an executive in an industrial organization, the principal activity of which is the production or fabrication of metals. He shall be one who, over a period of years, has consistently sponsored metallurgical research or development, and by his foresight and influence in making available financial support, has helped substantially to advance the Arts and Sciences related to metals."



H. G. Batcheller
Research Medal

Dr. Batcheller is a native of Brooklyn, N. Y. He was educated in Glens Falls, N. Y., and Wesleyan University, Middletown, Conn. He received the degree of Ph.B. in 1907 from Wesleyan, and was awarded a D. Eng. from Rensselaer Polytechnic Institute. He also received the degree of D.Sc. from Jefferson Medical College, Philadelphia, in 1951.

Dr. Batcheller began his industrial career with the Carnegie Steel Co. shortly after graduation from Wesleyan. In 1916 he resigned from Carnegie Steel to become assistant to the president of Ludlum Steel Co. He was elected vice-president of Ludlum Steel in 1918, and in 1925 he was made executive vice-president. In 1930 he was elected president.

In 1938, when Ludlum Steel Co. was merged with Allegheny Steel Co., Dr. Batcheller became president of the combined organization. In Dec. 1949, he was elected chairman of the board of Allegheny-Ludlum, the position he presently occupies.

October Metal Progress to Feature Show

A special feature of the October issue of Metal Progress will be a classified tabulation of products being displayed by the exhibitors at the Metal Show. Some of the more notable products will be described and illustrated in specially prepared editorial text corresponding to each of these categories.

Products will be listed and described under the headings of metals and alloys, metals manufacture, metal components, tooling, heat treating, temperature indicators and fuel controls, welding, cleaning and finishing, testing and inspection, and industrial equipment.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Birmingham	Sept. 17-18			Host for Southern Conference of Chattanooga, Georgia and Oak Ridge Chapters
Boston	Sept. 19	Peabody Country Club		Annual Outing
	Oct. 2	Hotel Shelton	George Leitch	Heat Treating
British Columbia	Sept. 29		Robinson	Phases of Welding
	Oct. 27		G. Vincent	Prelude to Kitimat—Aluminum
Buffalo	Sept. 10	Hotel Sheraton	Howard Scott	Fracture of Metals
	Oct. 8	Republic Steel Corp.		Plant Visit
Calumet	Sept. 19	Lake Hills Country Club		Annual Golf Stag
	Oct. 13	Phil Smidt's	Harry C. Hausman	Stamping and Forming of Sheet Metal
Canton Massillon	Oct. 6	Mergus Restaurant	H. Rassbach	Stainless Steel Melting
Carolinas	Sept. 22	Charlotte	McElgin	Heat Treating
Chicago	Sept. 14	Furniture Mart	Carl F. Floe	Carbonitriding
Cincinnati	Sept. 10	Engineering Soc. Hqd.	L. S. Rousseau	Heat Treating With Modern Salt Baths
	Oct. 8	Engineering Soc. Hqd.	Frank Hobbs	Heat Treating With Modern Controlled Atmospheres
Cleveland	Oct. 5	Hollenden Hotel	Mars Fontana	Corrosion of Metals
Dayton	Sept. 9	Delco Products		Plant Visit
	Oct. 14	Engineers Club	D. L. Colwell	Alloys for Die Casting
Detroit	Oct. 12	Rackham Bldg.	R. H. Aborn	Metallurgical Aspects of Modern Stainless Steel
Fort Wayne	Sept. 14	Hotel Van Orman	A. T. McPherson	Testing, Calibration and Research at the National Bureau of Standards
	Oct. 12	International Harvester Co.		Plant Visit
Hartford	Oct. 13	The Hedges, New Britain	D. Eldred	Quality Control
Indianapolis	Sept. 21	McClarney's Restaurant	C. A. Mueller	Controlled Atmospheres in Heat Treating
	Oct. 12	McClarney's Restaurant	Max Hansen	Titanium-Base Alloys
Louisville	Oct. 6	5 & 1 Club	Sam A. Wenk	Nondestructive Testing
Mahoning Valley	Oct. 13	V.F.W.	Roger A. Long	Refractory High Temperature Metals and Alloys
Manitoba	Sept. 10	Marlborough Hotel		Foundry Panel
Milwaukee	Sept. 22	City Club	Alfred Amorosi	Industrial Applications of Atomic Energy
	Oct. 13	City Club	L. E. Simon	Selection of Steels
Minnesota	Sept. 17	Covered Wagon	Panel Discussion	Cast Iron, Cast Steel, Malleable Iron and Ductile Cast Iron
	Oct. 15	Covered Wagon		Joint Meeting with American Foundrymen's Society
Montreal	Sept. 9	Lakeshore Country Club		Annual Golf Meeting
New Haven	Oct. 15	Colonial House, Hamden	Walter Keene	Manufacture and Applications of Clad Metals
New Jersey	Sept. 21	Essex House, Newark	J. B. Austin	Magnification in Time
New Orleans	Sept. 2		J. D. Graham	Fundamentals of Induction Hardening
	Oct. 7		C. K. Donoho	Nodular Iron
New York	Oct. 19		Alex Zitlin	Latest Developments in Heavy Presses
North Texas	Oct. 6	Ben Milam Hotel	D. J. McPherson	Physical Metallurgy of Titanium
Northern Ontario	Sept. 16	Windsor Hotel	G. Paul Burks	Blast Furnace Operation
Northwestern Pennsylvania	Sept. 17	G. E. Community Center, Erie	A. L. Rustay	Aluminum Forgings
Notre Dame	Oct. 14	Engineering Bldg.	H. K. Ihrig	Corrosion of Steels at High Temperatures
Ontario	Sept. 11	Hotel Queensway, St. Catherines	R. Smallman-Tew	Role of Physical Metallurgy in the Aircraft Industry
	Oct. 2	Royal Connaught Hotel, Hamilton	R. B. Mears	Designing to Prevent Corrosion
Oregon	Sept. 18	Oregon Saw Chain Corp.		Plant Visit
Ottawa Valley	Sept. 14	H.M.C.S. "Carleton"	John Convey	Australian Mining and Metallurgical Industry
	Oct. 6	Physical Metallurgy Research Laboratory	F. W. Boulger	Machinability
Peoria	Sept. 13	American Legion, Bldg., Morton, Ill.		Ladies Night
Philadelphia	Sept. 25	Temple University	P. DeHuff	Jet Engine Alloys
	Oct. 23	Engineers Club	T. C. DuMond	What's New in Engineering Materials
Pittsburgh	Sept. 11	Alcoma Country Club		Summer Jamboree and Golf Party
	Oct. 8	Ft. Pitt Hotel	Leo F. Reinartz	Carnegie Lecture

Puget Sound	**Sept. 9**	Tacoma		Plant Visit—Kaiser Aluminum & Chemical Corp., Aluminum Reduction Plant
Purdue	**Sept. 22**	Aluminum Co. of America	**A. L. Hurst**	Plant Visit
	Oct. 13	Purdue Union		Ladies Night—Style Fashions and Design of Automobiles
Rhode Island	**Sept. 19**	The Farm, Warwick		Annual Clambake
Rochester	**Sept. 12**	Pt. Pleasant Hotel		Annual Clambake
Rocky Mountain	**Sept. 18**	Oxford Hotel	**Victor Brown**	Forging of Titanium
	Oct. 16	Oxford Hotel	**C. C. Drake**	Precision Castings
Rocky Mountain	**Sept. 17**	Minnequa Club	**Victor Brown**	Forging of Titanium
Pueblo Group	**Oct. 15**	Minnequa Club	**C. C. Drake**	Precision Castings
St. Louis	**Sept. 18**	Forest Park Hotel	**K. R. Wickstrom**	Mechanical Testing and Physical Inspection Methods
	Oct. 5	Endicott, N. Y.	**Carl G. Johnson**	Making Structural Parts From Metal Powders
Saginaw Valley	**Sept. 12**	Brookwood Golf Club		Fall Outing
	Oct. 13	Frankenmuth	**H. H. Hanink**	Metals for Jet Engines
	Oct. 15	Engineers Club	**William Jones**	Magnetic Materials
Southern Tier	**Sept. 14**	Corning Glass Center	**Ralph Wilson**	National Officers Night
Syracuse	**Sept. 8**	Onondaga Hotel	**John Parks**	Recent Developments in Welding and Cutting
	Oct. 6	Onondaga Hotel	**Sam Tour**	Hot Spot Machining
Utah	**Sept. 24**		**R. N. McGee**	Personnel Relations
	Oct. 22		**Jack Layman**	Shell Molding
Texas	**Oct. 6**	Ben Milam Hotel	**D. J. McPherson**	Physical Metallurgy of Titanium
Tri-City	**Sept. 1**	Rock Island Arsenal	**H. B. Knowlton**	Conservation of Alloys in the United States and Europe
	Oct. 6	Rock Island Arsenal	**F. G. Tatnall**	New Developments in Testing
Washington	**Oct. 12**			Quench and Draw Party
Western Ontario	**Oct. 9**	Cobblestone Inn, London		Radioisotopes—Their Metallurgical Applications
West Michigan	**Sept. 21**	Lock's Restaurant	**F. E. Dreves**	Machinability
	Oct. 19	Lock's Restaurant	**I. A. DeGrote**	Quality Control
Worcester	**Sept. 9**	Svea Grill		Annual Smorgasbord
	Oct. 14	American Steel and Wire Co.	**R. R. Tatnall**	Plant Visit

Dr. Robert Mehl To Receive Franklin Institute Medal

For his major contributions to the fields of metallurgy and metallography and for his numerous fruitful investigations leading to obtaining values of theoretical and fundamental importance, Robert F. Mehl, director of the metals research laboratories and professor of metallurgy at Carnegie Institute of Technology, has been chosen to receive the Francis J. Clamer Medal of the Franklin Institute of the State of Pennsylvania. The award will be made at the Institute's formal Medal Day ceremonies in October.

Dr. Mehl, who for the past 20 years has exerted a powerful influence on the development of metallurgical education in the United States, has a long history of awards and medals behind him. In 1952 he received A.S.M.'s Gold Medal in recognition of "his outstanding metallurgical knowledge and exceptional ability in the diagnosis and solution of diversified metallurgical problems". He received the Sauveur Achievement Award in 1951, was the Campbell Memorial Lecturer in 1941, and received the Henry Marion Howe Medal of the A.S.M. for the best paper in the 1939 *Transactions*. He

has received the American Institute of Mining and Metallurgical Engineers Institute award, the John Scott Medal, the Medal of the American Industrial Radium and X-Ray Society and the James Douglas Gold Medal. The Annual Mehl Lecture is given in his honor before the Society for Nondestructive Testing.

Dr. Mehl was a pioneer in the application of gamma-ray radiography to the study of welds and castings, and was the first in this country to apply the electron microscope to the study of the microstructure of steel. His investigation of the mechanism of crystallization in the solid state involved in the formation of Widmanstatten structures in metals led to the modern theory of the age hardening of alloys. He has made detailed investigation of the structure and mode of formation of pearlite, as well as fundamental studies on diffusion, crystal nucleation and grain growth, all of which have had an important bearing on our present understanding of the microconstituents and hardenability of steel.

Dr. Mehl's indirect influence on industrial metallurgy has been felt many times through the medium of his former students. As an example of his direct contributions to practical metallurgy one may cite the reports of the investigations which he made for the Metallurgical Advisory Board during World War II. This work has been appraised as "probably the most important war-time contribution to gun tube manufacture from the standpoint of cost and time-saving, smooth production and clear understanding of the physical test results".

New York Holds High-School Course on Metallurgy

Attending One of the Four Educational Lectures in the Series on the "Science of Metals" Presented by the New York Chapter of the American Society for Metals Are a Large Group of Boys From the New York Area

Reported by John P. Nielsen
New York University
College of Engineering

Awards to three New York students for outstanding performance in an educational course on the "Science of Metals" sponsored by the New York Chapter were recently announced. The three award winners were Donald -Obeiter and Frank Bader, of Brooklyn Technical High School, and Charles Allen, a student at New York State Institute, the cash portion awards being $25, $10 and $10, respectively. J. A. Voelker, Donald Watt, and John Zarnitz, all of Brooklyn Technical High School, were given honorable mention awards.

The course on the "Science of Metals" is given annually for both high school and college students in the New York area who are not as yet pursuing a curriculum in metallurgical engineering. Its purpose is to acquaint pre-engineering students with the scientific aspects of metallurgy. This year 140 students from 20 schools took the 4-lecture course held at the Brooklyn Technical High School.

The lecturers were O. H. Henry, professor at Polytechnic Institute of Brooklyn, who spoke on "What Is a Metal", H. Kellogg, professor at Columbia University, who spoke on "Chemistry of Metals", John P. Nielsen, professor at New York University, who spoke on "Physics of Metals", and Sam Tour, of Sam Tour, Inc. who gave a discussion on "Metals in Industry".

Details Experiences Of Four Scientific Trips to Europe

Reported by Clyde O. Penney
Metallurgist
Denver & Rio Grande Western Railroad

Samuel L. Hoyt, technical advisor at Battelle Memorial Institute, spoke at a meeting of the Rocky Mountain Chapter recently on his "Metallurgical Experiences in Europe".

Dr. Hoyt discussed in detail experiences encountered on his four trips to Europe. In 1911 he went to Germany to continue his scientific studies, and while there, enjoyed invaluable experiences with such great men in the field of metallurgy as Dr. Merica, Dr. Hultgren, Dr. Martens (the father of Martensite), and many others.

In 1925, Dr. Hoyt again traveled to Europe to renew old friendships, and while there obtained information which enabled him to pioneer in the development of Carboloy and hard metals. His experience was enriched by intimate contact with the leading scientists of Europe who were pioneering in the study of plastic deformation using X-ray techniques.

In 1945, Dr. Hoyt was called on by the United States Army to go to Germany to confer with German scientists on metallurgical subjects. Upon his return from this trip, Dr. Hoyt reported important advances made in the fields of metallurgical research, including such developments as powdered iron, powdered steel, high-temperature steels containing titanium, jet engine materials, bonding of titanium oxide coatings on pure molybdenum, aluminum alloy bearings, welded bridges, noncracking welding electrodes, and basic side-blown converter practice.

Dr. Hoyt's most recent trip, completed in 1952, was under the auspices of the Battelle Memorial Institute for the purpose of establishing international branches of Battelle. At the present time, most of the research facilities in Europe are sponsored by the respective governments and hence are closed to private industry.

Battelle Memorial Institute is establishing branch research institutes where private industries will have an opportunity to bring their own problems and secure the services of top-flight research men.

Milne Begins Construction

A. Milne & Co., nationwide distributors of solid and hollow tool-steels, has broken ground for a new building which will provide expanded facilities for Milne's Chicago sales office and warehouse.

The building will be of modern architectural design with face brick, steel sash construction. Ample, modern office space for Milne's Chicago sales staff will be included in the approximately 12,000 sq. ft. of warehouse floor area.

Manitoba Secretary-Treasurer Honored

John Tapley (Left), Secretary-Treasurer of the Manitoba Chapter for the Past Three Years, Has Been Transferred to Vancouver Where He Will Open a New Branch Office for His Company, A. Balfour & Co. (Canada) Ltd. At a testimonial dinner given in his honor, Mr. Tapley was presented with a desk clock by George E. Mason, past chairman. (Reported by E. J. Klassen)

Cites Advantages of Testing Lubricating Oils to Predict Troubles

Reported by R. O. Elliott
Los Alamos Scientific Laboratory

"Electron Microscope Studies of Lubricating Oils as Related to Metallurgical Factors" was the subject of a talk given by Ray McBrian, chief engineer of standards and research, Denver and Rio Grande Western Railroad, at a meeting of the Los Alamos Chapter.

Mr. McBrian has participated in and coordinated a remarkable research program for determining machine wear, efficiencies of lubricating oils, and new fuel oil controls on Denver and Rio Grande Western Railroad diesel locomotives. He described the laboratory techniques for utilizing the electron microscope, spectrograph, and radiograph tracer isotopes for solving engineering problems on locomotives in actual operation.

Electron micrographs were shown to illustrate that oils and diesel fuels are not true solutions but are actually colloidal suspensions, the particle dispersions of which have been related to engine wear and performance. Spectrographic analyses of oil samples taken from engines in service are used to detect excessive wear and to predict engine troubles before they occur. By utilizing these up-to-date techniques, the Denver and Rio Grande Western Railroad has greatly extended the time between engine overhauls and oil changes, thus reducing operation costs.

Pressed Metal Institute Adds Engineering Section

Immediate establishment of a technical and engineering department for the Pressed Metal Institute has been approved by the Institute's Board of Directors. The department will be headed by a full-time technical director attached to the staff at the Institute's headquarters in Cleveland.

This department will study those technical trends having a far-reaching affect on the industry; will provide liaison with other technical committees and the government; advise of technical advances in competing industries; publish a monthly technical bulletin; compile a handbook for the industry; and extend cooperation to engineering colleges. It is anticipated that original research will eventually become a part of this program.

U. S. Steel Expands

A new rod mill will be constructed on properties of the present Cuyahoga Works of the American Steel & Wire Division of the U. S. Steel Corp., in Cleveland. This major step in modernizing and expanding production facilities will increase the plant's rod production and replace older equipment.

The new facilities will include a combination rod mill, billet storage areas, and rod storage areas, and will have a rated capacity of 450,000 tons per year compared to the present equipment which dates back to 1916 and has a rated capacity of 313,000 tons per year.

Discusses Theories of The Refining of Lead

Reported by A. S. Vince
Royal Canadian Mint

James U. MacEwan, chairman, department of metallurgical engineering, McGill University, spoke on, the "Refining of Lead", at a meeting of the Ottawa Valley Chapter.

The electrolytic and the pyrometallurgical methods of refining lead bullion, both of which yield lead of very high purity, were discussed. The theory or theories on which the separation of each element occurring in lead bullion is based were presented. These theories, which have been very thoroughly developed and universally accepted, include a wide range of physical and chemical relationships, most of which are common to the whole metal refining industry but probably more thoroughly understood in lead refining because of the low melting point of lead.

Commercial applications of these theories were exemplified in the discussion on ordinary lead refining practices and in the continuous lead refining process in use for a number of years at Port Pirie, Australia.

Tribute was paid to the research workers and to industry through whose efforts two entirely different methods of refinery are practiced, each yielding metal of extreme commercial purity.

Speaker Gives Resume of High-Temperature Metals

Reported by J. H. Schaum
National Bureau of Standards

The Washington Chapter heard J. D. Nisbet, manager of the materials and process section, metallurgy research department, General Electric Co., present a resume of the development of "High-Temperature Metallurgy" at a recent meeting.

Mr. Nisbet compared the properties of cobalt, iron, nickel, and chromium-base alloys at temperatures and loads where failure occcurs by creep. He illustrated the effects of adding the compound-formers tungsten, molybdenum, niobium, and carbon. Such impurities as oxygen, nitrogen, hydrogen, silicon, phosphorus, sulfur, titanium, aluminum, and manganese are usually found segregated in the grain boundries.

The speaker pointed out that the greater the difference in atom size between solution metal and added element, the greater the hardening effect. Hardening effects of various elements in nickel, cobalt, iron-chromium, iron-nickel-chromium, and iron-nickel-chromium-colbalt type alloys were illustrated. It was emphasized that hardening effects of individual elements were not additive.

Tri-Chapter Meeting Reviews Aircraft Metallurgy

Present at the Fifteenth Annual Tri-Chapter Meeting of the Cincinnati, Columbus and Dayton Chapters of the American Society for Metals Were, From Left: Arthur B. Westerman, Columbus Vice Chairman; John C. McDonald, Dow Chemical Co.; A. J. Pepin, Wyman-Gordon Co.; Kirby F. Thornton, Aluminum Co. of America; J. B. Johnson, Wright-Patterson Air Force Base; T. W. Lippert, Titanium Metals Corp. of America; R. H. Thielemann, Pratt & Whitney Co.; E. J. Bleakley, Jeffrey Mfg. Co., Columbus Chairman; and A. M. Hall, Tri-Chapter Program Chairman. Mr. Westerman and Mr. Hall are with Battelle Memorial Institute, Columbus

Reported by A. N. Eshman
North American Aviation, Inc.

The fifteenth annual Tri-Chapter Meeting of the Columbus-Cincinnati-Dayton Chapters of the American Society for Metals featured a review of "Aircraft Metallurgy". It was held at Battelle Memorial Institute.

This year's program included discussions on design philosophy, materials used, new material developments for airframe and turbo-jet engine usage, with particular emphasis on the necessity of materials possessing a high strength-weight ratio at elevated temperatures.

J. B. Johnson, chief, metallurgy research branch, flight research laboratory, Wright-Patterson Air Force Base, gave an exposition on those aspects of airframe and turbo-jet engine design philosophy which determine the requirements that materials of aircraft construction must meet.

Kirby F. Thornton, chief engineer, New Kensington Development Division, and head of the aircraft section, Aluminum Co. of America, gave a description of the specific alloys and their applications, with emphasis on new developments and uses.

John C. McDonald, assistant technical director, Magnesium Division, Dow Chemical Co., spoke on the application of magnesium alloys to aircraft construction. He described alloys in use and specific applications, emphasizing new developments.

T. W. Lippert, manager of sales and technical service, Titanium Metals Corp. of America, cited the potentialities of titanium for aircraft applications. He gave the uses being made of titanium today, and trends and future prospects of titanium in the aircraft of tomorrow.

R. H. Thielemann, development metallurgist, Pratt & Whitney Division, United Aircraft Corp., talked on the latest developments in high-strength, high-temperature alloys for aircraft engine power plants.

A. J. Pepin, manager of research and quality control, spoke on large forgings in aircraft production, and explained their uses and the production problems involved in manufacturing them.

John F. Victory, executive secretary, National Advisory Committee for Aeronautics, spoke on problems imposed by very high speed flight.

Aircraft Salvage Techniques Explained at Los Alamos

Reported by R. O. Elliott
Los Alamos Scientific Laboratory

"Aircraft Salvage Techniques" was the subject of a talk given at Los Alamos by J. J. Miller, of the flight test department of Sandia Corp.

In the spring of 1945 the Albuquerque airfield suddenly became a storage depot for thousands of war-weary aircraft of every description—gliders, trainers, transports, bombers, fighters, etc. Mr. Miller, who was in charge of the depot for the R.F.C. and later for the War Assets Administration, sold 540 of these planes in the succeeding 18 months. The sales included gliders, trainers, and transports, which brought from $100 to $90,000 each. The rest, mostly worn-out fighters and bombers, were judged obsolete and put up for bid as scrap. The bid was awarded to the Compressed Steel Company, Inc., which installed a smelter in a hangar and started to melt down the planes.

The planes were first stripped of engines, propellers, radio equipment, instruments, oxygen equipment, and other parts made from lead or magnesium. Then they were sheared into huge chunks, suitable for furnace charging, by dropping a sharpened 10,000-lb. sheet of armor plate upon them.

The furnace temperature was controlled at 1250° F., which was high enough to melt the aluminum but not the other metals contained in the scrap. The materials that did not melt with the aluminum, mostly copper and steel, were periodically raked out of the furnace and sold as scrap metal. The molten aluminum in the holding hearth was tapped once every 4 hr., at which time eight 1500-lb. ingots of 95% aluminum were obtained.

In this way, our air fleets of World War II were reduced to aluminum ingots for peacetime use at the rate of half a million pounds weekly.

Joint ASM-ACS-AIME Meeting in Spokane

Reported by F. R. Morral
Kaiser Aluminum & Chemical Corp.

The Inland Empire Chapter held a joint meeting with the local chapters of the American Chemical Society and the American Institute of Mining and Metallurgical Engineers in June. The International Nickel Co.'s film "Corrosion in Action" was shown, and a panel discussion by members of the societies followed.

H. M. Louderback, chemistry teacher at the Lewis and Clarke High School in Spokane, spoke on the great success of the Science Fair held for high school pupils in the area earlier in the year. The Inland Empire Chapter had sponsored a contest in connection with the Fair and had given prizes of books for the best essays on the pupils' impressions of the Fair.

College Alumni Groups To Hold Luncheons

Special luncheons to be held during the week of the National Metal Congress and Exposition will include some 28 schools and colleges. All college luncheons will be held on Wednesday, Oct. 21 at 12 noon. Tickets for the luncheons will be on sale at the registration desks at the Hotel Statler and the Auditorium, and must be purchased before 6 p.m. on Tuesday.

The colleges participating in the luncheons are as follows: Carnegie Institute of Technology, Case Institute of Technology, University of Cincinnati, Columbia University, Cornell University, Fenn College, University of Illinois, Illinois Institute of Technology, University of Kentucky, Lafayette College, Lehigh University, Massachusetts Institute of Technology, University of Michigan, Michigan State College, University of Minnesota, Missouri School of Mines and Metallurgy, University of Notre Dame, Ohio State University, University of Pennsylvania, Pennsylvania State College, University of Pittsburgh, Purdue University, Rensselaer Polytechnic Institute, South Dakota School of Mines and Technology, Stevens Institute of Technology, University of Wisconsin, Worcester Polytechnic Institute and Yale University.

Ladies Entertainment

The societies cooperating in the National Metal Show will each hold various functions for the entertainment of the ladies visiting Cleveland with their husbands. Headquarters for the A.S.M. ladies committees will be at the Hotel Statler, and for the A.W.S. at the Hotel Cleveland.

Industrial Gas Breakfast

The Industrial Gas Breakfast and meetings of the Metals and Industrial Processing Committees of the American Gas Association will be held on Wednesday, Oct. 21 at the Hotel Hollenden during the National Metal Show.

George Roberts, A.S.M. vice-president elect, will attend the meeting and extend greetings from the American Society for Metals.

Tungsten Institute Formed

Formation of the Tungsten Institute, with headquarters in Washington, D. C., has been announced by W. Lunsford Long, president of the new organization. Any individual company engaged in the production of tungsten concentrates from domestic ores or owning American tungsten deposits is eligible for membership in the Institute, which now represents about 4/5's of all American tungsten production.

Science Achievement Award Program Starts Third Year

For the third school year in succession, more than 100 science students in grades 7 through 12 will be awarded cash prizes, gold medals, and certificates in recognition of quality performance in science activities. This program was developed by the American Society for Metals in conjunction with the National Science Teachers Association. It is conducted as a project of the Future Scientists of America Foundation.

Awards are based on student reports of experimental and investigational work in science or mathematics. Awards are divided equally among eight regions of the country so the students are not competing with "the whole world" but only with fellow students in their own region.

Members of local or regional chapters of the American Society for Metals are urged to bring this program to the attention of teachers and students in schools in their localities and to encourage participation wherever possible.

Additional information about the program can be obtained from A.S.M. headquarters, 7301 Euclid Ave., Cleveland, or from the National Science Teachers Assoc., 1201 Sixteenth St., N.W., Washington 6, D. C.

Morris Bean Adds Space

Floor area of the Yellow Springs, Ohio, plant of Morris Bean and Co.'s Antioch Process aluminum foundry will be brought to 88,000 sq. ft. by an addition now under construction. The new area will be in full production by January 1954. Maximum productive capacity will be upped by 60% and will require about 100 new employees to maintain projected operating schedules.

The Yellow Springs plant specializes in aluminum castings made by the "Antioch Process" developed by Morris Bean between 1930 and 1936.

Steps are being undertaken to increase the capacity of the Morris Bean & Co. ductile iron foundry in Cedarville, Ohio. By the first of the year it is anticipated that the production of the iron foundry will be four times the current level.

IMPORTANT MEETINGS *for October*

Oct. 5-7—American Society of Mechanical Engineers. Fall Meeting, Sheraton Hotel, Rochester, N. Y. (George A. Hastings, A.S.M.E., 33 West 42nd St., New York 36, N. Y.)

Oct. 7-9—National Association of Corrosion Engineers. South Central Regional Meeting, Tulsa, Okla. (A. B. Campbell, Executive Secretary, N.A.C.E., 919 Milam Bldg., Houston 2, Tex.)

Oct. 7-10—Pressed Metal Institute. Annual Meeting. Bellevue-Stratford Hotel, Philadelphia. (E. M. Ross, P.M.I., 2860 East 130th St., Cleveland 20, Ohio)

Oct. 8-9—Gray Iron Founders' Society, Inc. 25th Silver Anniversary Meeting, Hotel Jefferson, St. Louis, Mo. (W. M. Caldwell, G.I.F.S., National City-East 6th Bldg., Cleveland 14, Ohio.)

Oct. 14-16—Scientific Apparatus Makers Association. Midyear Meeting of Recorder-Controller Section, Seaview Country Club, Absecon, N. J. (Kenneth Andersen, Executive Vice-President. S.A.M.A., 20 N. Wacker Drive, Chicago, Ill.)

Oct. 14-16—American Institute of Electrical Engineers. Machine Tool Conference. Cleveland Hotel, Cleveland, Ohio. (H. H. Henline, Secretary, A.I.E.E., 33 West 39th St., New York 18, N Y.)

Oct. 15-17—Optical Society of America. Thirty-Eighth Annual Meeting. Sheraton Hotel, Rochester, N. Y. (A. C. Hardy, Secretary, O.S.A., Massachusetts Institute of Technology, Cambridge 39, Mass.)

NATIONAL METAL CONGRESS
(Registration Charges for Technical Sessions)

American Society for Metals
Members and Guests: No Charge

Institute of Metals Division AIME
Members: $2.00
Non-Members: $4.00
Students: $1.00

Society for Nondestructive Testing
Members: No Charge
Non-Members: $3.00

American Welding Society
Members: $1.00
Non-Members: $2.00

ADMISSION TO METAL EXPOSITION

Badges or membership cards for the four cooperating societies listed above will admit members and guests to the Exposition at no charge. Visitors with Metal Show invitations or with registration cards properly filled out will be issued a badge at no charge. All others will be charged a registration fee of $1.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Fred Body, Ardeth Holmes, Norma King, Thelma Sparks and Members of the Translation Group

A
General Metallurgical

222-A. Certain Metallic Material in Short Supply in the Iron and Steel Industry. I. Steel Scrap for Remelting. II. Substitute Alloy Steels. A. B. Scott. *Australasian Engineer,* April 7, 1953, p. 53-62; disc. p. 62-65, 121, 123-125.

Part I: Classification and importance of steel scrap to the iron and steel industry. Scrap identification, segregation, preparation for processing, and utilization. Part II: Use of substitute alloy steels to conserve strategic alloying elements. Use of B as an alloying element. Composition and properties, particularly hardenability, of substitute types of carburizing steels, structural steels, toolsteels, and corrosion and heat resisting steels are compared with the standard grades normally specified. Graphs, tables. (A8, B, ST, AY, TS, CI)

223-A Metallurgical Research. Some of the Work of the British Non-Ferrous Metals Research Association. *Automobile Engineers,* v. 43, June 1953, p. 258-262.

Cr plating in general and on Al; use of electron microscope; work on stretcher-strain markings; and corrosion of nonferrous metals. Photographs. (A9, L17, M21, Q24, R general, Cr, Al, EG-a)

224-A. Mineral Resources and Our Economy. Richard J. Lund. *Battelle Technical Review,* v. 2, July 1953, p. 70-75.

Need for conservation, long-term demand-supply picture, effect of technological advances, role of substitution, price, and foreign supplies. Graphs. (A4, B10)

225-A. Brighter Future for the Rare Earths. Roland B. Fischer. *Battelle Technical Review,* v. 2, July 1953, p. 76-77.

Factors encouraging expanded use and sources of rare earths. Interest of Atomic Energy Commission. (A4, B10, EG-g)

226-A. The Present and Future Metallurgical Requirements of the Chemical Engineer. Christopher Hinton. *Institute of Metals, Journal,* v. 81, June 1953, p. 465-470.

Increasing demands of the chemical engineer upon the metallurgist for new materials. (A5)

227-A. A Dynamic Program for Conservation. J. R. Townsend. *Metal Progress,* v. 63, June 1953, p. 79-81.

Conservation of strategic elements by substitution of more plentiful elements; reprocessing and redesigning products; more standardization, and opening up new sources. (A8)

228-A. More Foreign Aluminum Needed in Third Quarter to Offset Current Shortage in Prime Industry. Edmund Dillworth. *Metals,* v. 23, June 1953, p. 7-8.

Al supply and demand from 1947 to the present and the outlook for the future. (A4, Al)

229-A. (German.) Planned Cost Calculations in the Iron Industry. Hans Diercks and Franz Petzold. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 183-190.

Computations from other industries and from American Fe industry are basis for discussion of similar figures for German Fe industry. A new system is introduced. Tables. (A4, Fe)

230-A. Pure and Applied Science in Metallurgy. Cyril Stanley Smith. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 11-20.

Place of metallurgy in science; university and industrial research; and government vs. business research. (A9)

231-A. Outlook for Steel Consumption. Steel Demand. Bay E. Estes. *Analysts Journal,* v. 9, June 1953, p. 93-98.

Method of forecasting steel demand, short-term outlook for steel, and longer-range prospects. (A4)

232-A. Lead & Zinc. *Engineering and Mining Journal,* v. 154, July 1953, p. 130-137.

Current demand and supply and plans for future. Tables, photographs. (A4, Pb, Zn)

233-A. Copper. *Engineering and Mining Journal,* v. 154, July 1953, p. 110-119.

New Cu projects operating, in construction, or planned. Table, photographs, (A4, Cu)

234-A. Aluminum. I. W. Wilson, R. S. Reynolds, Jr., and Nathanael V. Davis. *Engineering and Mining Journal,* v. 154, July 1953, p. 120-129.

Current world production and future plans. Tables, photographs. (A4, Al)

235-A. Uranium. *Engineering and Mining Journal,* v. 154, July 1953, p. 138-141.

World production. Table, photographs. (A4, U)

236-A. Titanium. *Engineering and Mining Journal,* v. 154, July 1953, p. 142-145, 316.

Research developments. Photographs. (A9, Ti)

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

237-A. Nickel-Cobalt. *Engineering and Mining Journal,* v. 154, July 1953, p. 146-149.

World areas of production. Photographs. (A4, Ni, Co)

238-A. Notes on European Furnace Practice. Matthew H. Mawhinney. *Industrial Heating,* v. 20, July 1953, p. 1315-1316, 1318.

Furnace development, fuel utilization, and furnace practice. (A5)

239-A. Welding Torch Fires. H. Edgar Beaven. *Factory Management and Maintenance,* v. 111, July 1953, p. 132-133.

Prevalence of the fires, how they start, and prevention. (A7, K2)

240-A. Disposal of Plating Room Wastes. VI. Treatment of Plating Room Waste Solutions With Ozone. *Plating,* v. 40, July 1953, p. 777-780.

Mechanism and extent of oxidation of free and metallo-complex cyanides by ozone and possible application in treatment of waste solutions. Table, diagrams. (A8, L17, Cu, Zn)

241-A. (French.) Canadian Hydro-Electric Development Nechako-Kemano-Kitamat and Aluminum Production. *Journal du Four Electrique,* v. 62, no. 2, Mar.-Apr. 1953, p. 48-49.

Gigantic Canadian Kitamat hydroelectric station which will produce 1,670,000 h.p.—most powerful in world. Map, photograph. (A5, C general, Al)

242-A. (Book.) American Iron and Steel Institute, Regional Technical Meetings, (Annual Volume), 1953. 516 p. American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

Consists of 26 addresses presented at a series of 5 meetings. (A general, D general, ST)

243-A. (Book.) The European Steel Industry and the Wide-Strip Mill. 100 p. 1953. United Nations Economic Commission for Europe, Industry Division.

Past production and consumption trends in the U. S. and Western Europe. Future trends are analyzed. Industrial uses of wide strip, exports, and markets. (A4, ST)

244-A. (Book.) Introduction to Industrial Metallurgy. Leslie Aitchison. 456 p. 1949. MacDonald & Evans, 8 John St., Bedford Row, W.C.1, London, England.

Structure, organization, operation, and control of the metallurgical industry. (A4)

245-A. (Book.) Iron and Steel Directory. Ed. 7. 386 p. 1953. Louis Cassier, Co., Ltd., Dorset House, Stamford St., London, S.E.1, England. 25s. (postage 8d.)

A guide to British pig iron manufacturers, iron founders, steel founders, and steelworks. Also contains technical data for engineers, metallurgists, and iron and steel makers and users. Includes typical compositions for various grades of iron,

steel, and ferro-alloys; abstracts of British specifications for ferrous materials; and a number of useful conversion tables. (A10, S22, ST)

246-A. (Book.) **Technology of Engineering Materials.** B. Richard Hilton. Butterworth Scientific Publications, Bell Yard, Temple Bar, London, W.C.2. 36s.

Includes pattern-making and patterns; molding and foundry practice; production of ferrous metals and alloys; mechanical treatment of steels; heat treatment of ferrous metals and alloys; production of nonferrous metals and alloys; mechanical and heat treatment of nonferrous metals and alloys. (A general)

247-A. (Book—German.) **(Outline of General Metallurgy.) Grundriss der Allgemeinen Metallkunde.** E. Brandenburger. 333 p. 1952. Ernst Reinhardt Verlag, Basel, Switzerland.

Fundamentals of metallurgy. Pure metals, various types of alloys, and chemical reactions of metals. (A general)

B

Raw Materials and Ore Preparation

136-B. De-Leading a Copper Concentrate. Peter S. Jack. *Canadian Mining and Metallurgical Bulletin,* v. 46, June 1953, p. 373-375.

Method of recovering Pb by blanketing the Cu concentrate. Testing procedures and results. Photographs, tables. (B14, Cu, Pb)

137-B. The Application of the Liquid-Solid Cyclone as a Classifier in Closed-Circuit Grinding at Rand Leases (V) G.M. Co. Ltd. M. J. Dennehy and S. K. De Kok. *Chemical Metallurgical & Mining Society of South Africa, Journal,* v. 53, March 1953, p. 261-278; disc., p. 278-284.

Design of the cyclone, operating characteristics, and method of fitting it into the plant. Results obtained to date. Diagrams, tables. (B13)

138-B. Castable Refractories in the Steel Mill. J. D. McCullough. *Iron and Steel Engineer,* v. 30, June 1953, p. 84-89; disc., p. 89-93.

Castables having alumina-silica base and densities of 125 lb. per cu. ft. dried weight. Properties, installation, and typical applications. Diagrams, photographs. (B19)

139-B. Chemical Treatment of Low-Grade Manganese Ores. Conversion of Manganese Dioxide Into Manganese Sulphate. Ruth Blumberg and T. D. Morgan. *Journal of Applied Chemistry,* v. 3, May 1953, p. 223-233.

New method for converting MnO_2 into $MnSO_4$ by treating Mn wad with gaseous SO_2. Graphs, diagrams, tables. (B14, Mn)

140-B. Beneficiation of Low Grade Chrome Ore From Dodkatur, Mysore State. M. C. Sen and P. I. A. Narayanan. *Journal of Scientific & Industrial Research,* v. 12A, Apr. 1953, p. 185-187.

Experimental procedures and results. Tables. (B14, Cr)

141-B. Sherritt Gordon Uses Ammonia Leach for Lynn Lake Ni-Cu-Co Sulphides. *Mining Engineering,* v. 5, June 1953, p. 576-581.

Development of a hydrometallurgical process for recovering pure metal from sulfide concentrate. Photographs. (B14, Ni, Cu, Co)

142-B. Grinding Ball Classification. Its Effect on Capacity and Ball Migration. C. MacArthur Carman. *Rock Products,* v. 56, June 1953, p. 106-109, 151.

Effect upon grinding mill capacity and grinding ball migration resulting from improved grinding ball classification. Diagrams. (B13)

143-B. Crushing Practice and Theory. XVI. Brownell McGrew. *Rock Products,* v. 56, June 1953, p. 128, 130, 132, 134, 136, 138, 140, 142, 144, 146.

Crusher operations in open and closed circuits are compared. Advantages of surge bins and storage piles. Tables. (B13)

144-B. Semi-Microchemical Method for Determining the Basicity of Slag. B. A. Generozov. Henry Brutcher Translation 2985, 6 pages. (From *Zavodskaya Laboratoriya,* v. 16, 1950, no. 6, p. 666-668.)

New method based on the extraction of a sufficient percentage of CaO to insure measurable consumption of acid solution during titration. Table, graph. 6 ref. (B21)

145-B. (German.) **Functions of Grinding.** G. F. Hüttig. *Monatshefte für Chemie,* v. 84, no. 2, 1953, p. 272-277.

Results of granulometric analysis as six functions of grinding. Application of statistical mechanics to grinding processes. Graphs. 6 ref. (B13)

146-B. Andrew Carnegie, Geochemistry and Refractories. E. F. Osborn. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 103-114.

Research into development of better refractories. Photographs. (B19)

147-B. Some Raw Material Problems of the Indian Iron and Steel Industry. Phiroz Kutar. *Blast Furnace and Steel Plant,* v. 41, July 1953, p. 755-760.

Preparation of coal, ore, flux, oxygen, and ferro-alloys. (B10, B22)

148-B. Iron Ore. *Engineering and Mining Journal,* v. 154, July 1953, p. 100-109, 168.

Projects undertaken to meet the new era's demand for steel. Table, photographs. (B general, Fe, ST)

149-B. Thermal Beneficiation of Low Grade Manganese Ores. P. K. Gupte, G. P. Contractor, and B. R. Nijhawan. *Journal of Scientific & Industrial Research,* v. 12A, May 1953, p. 230-233.

Investigation to separate Fe from low-grade Mn ore by thermal reduction. A slag rich in Mn is obtained, which can subsequently be charged into the blast furnace for production of ferromanganese. Tables. (B14, Mn, Fe)

150-B. Crushing Plant Dust Control at the Ray Mines Division, Kennecott Copper Corp. John F. Knudsen. *Mining Engineering* v. 5, July 1953, p. 689-695.

Methods used in different processes to control dust dissemination. Tables, photographs. 6 ref. (B13, Cu)

151-B. (French) **Tests for Magnetic Roasting of Hematite at Striberg.** G. von Hofsten. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* v. 10, no. 5, 1953, p. 693-729.

Series of tests for the above in a shaft furnace. The experimental arrangement is diagrammed and discussed. The results during eight periods are given and compared with those obtained in other installations. Tables, micrographs. 11 ref. (B15, Fe)

152-B. (Book.) **Aluminum in Iron and Steel.** Samuel L. Case and Kent R. Van Horn. 478 p. John Wiley & Sons, 440 4th Ave., New York 16, N. Y. $8.50.

An exhaustive, critical world-wide review of research on use of Al in modern ferrous metallurgy. Covers use of Al as a deoxidizer and as an alloy. (B22, Al)

C

Nonferrous Extraction and Refining

111-C. FluoSolids Reactor at Alcan's Arvida Plant Centrally Instrumented. *Canadian Chemical Processing,* v. 37, June 1, 1953, p. 42, 44, 46, 48.

Production of H_2SO_4 used in preparation of AlF_3 which is added to the bath in each reduction furnace. (C21)

112-C. Magnesium Production in the Southwest. W. J. Rave. *Electrochemical Society, Journal,* v. 100, July 1953, p. 179C-181C.

Plants for production of Mg from seawater. (C22, Mg)

113-C. The Aluminum Industry of the Gulf Coast Area. F. L. Kaestle. *Electrochemical Society, Journal,* v. 100, July 1953, p. 174C-178C.

Al production in the area, and alumina and Al reduction processes. Considers power requirements. Photographs. (C general, Al)

114-C. Research Reaps Rewards. Huge Alloy Plant to Produce Simplex Ferrochrome, Purer Cr and Mn. *Journal of Metals,* v. 5, July 1953, p. 886-887.

New plant to produce standard grades of ferrochrome, ferromanganese, and silicomanganese, and extra low carbon ferrochrome marketed under the name "Simplex", and electrolytic Cr and Mn. (C general, B22, Cr, Mn)

115-C. Metal Casting Methods. III. Continuous Casting. J. B. McIntyre. *Metallurgia,* v. 47, June 1953, p. 292-294.

Development and advantages of continuous casting. Method is widely used for Al alloys. (C5, Al)

116-C. Atomic Power Metal. A. H. Roberson. *Mining World,* v. 15, July 1953, p. 54-56.

Production problems, Kroll process, melting problems, properties, and possible uses of Zr. Photographs. (C26, T general, Zr, SS)

117-C. Vacuum Metallurgy Grows. Can You Use It? Allen G. Gray. *Steel,* v. 132, June 29, 1953, p. 88-91.

Advantages of vacuum melting in tests on Ti, Zr, Mo, cast steel, alloys, Pb, and Zn. Uses of arc-type and induction-type vacuum furnaces. Diagrams, photographs. (C25, D8, Ti, Zr, Mo, CI, Pb, Zn)

118-C. (English.) **On the Purification of Zirconium From Hafnium by Anion Exchange in Hydrochloric and Hydrofluoric Acid Mixtures.** Wilhelm Forsling. *Arkiv For Kemi,* v. 5, no. 6, 1953, p. 503-516.

Radiochemical investigation was made. Objective was to study possibility of purifying Zr from such amounts of Hf as generally occur with it in nature. Diagrams. 30 ref. (C2, Zr, Hf)

119-C. (French) **Electrolytic Dissociation of Alumina in Solution in Melted Cryolite.** Y. Doucet. *Journal de Chimie Physique et de Physico-Chimie Biologique,* v. 50, no. 1, Jan. 1953, p. 42-44.

A theoretical study. Tables, graphs. (C23, Al)

120-C. (French.) **Operating Conditions of Electrolysis Vats for Producing Aluminum With Low Contents of Alumina.** L. Ferrand. *Journal du Four Electrique,* v. 62, no. 1, Jan.-Feb. 1953, p. 15-17.

Includes diagram. 10 ref. (C23, Al)

121-C. (French.) **Metallurgy of Cobalt at the Union Miniere du Haut**

Katanga (Belgian Congo.) *Journal du Four Electrique*, v. 62, no. 1 Jan.-Feb. 1953, p. 18-21.

Production of Co by hydrometallurgy and thermal refining. Photographs, tables. (C23, Co)

122-C. (French.) The Future Development of Electrometallurgical and Electrochemical Industries in India. *Journal du Four Electrique*, v. 62, no. 2, Mar.-Apr. 1953, p. 49.

The Central Electrochemical Institute, inaugurated Jan. 1953, envisages electrochemical exploitation of native Al, Mg, Pb, Na, Cl_2, calcium carbides, and special steels. (C general, D general, B10, Al, Mg, Pb, Na, ST)

D

Ferrous Reduction and Refining

239-D. Low-Frequency Induction Melting Employed in Malleable Foundry. Curtis Pollock. *Foundry*, v. 81, July 1953, p. 108-111, 266-269.

How low-frequency induction furnaces provide minimum cost, uniform quality Fe for malleable foundry. Photographs. (D6, E10, CI)

240-D. Pittsburgh Steel Company Increases Production Capacity. *Iron and Steel Engineer*, v. 30, June 1953, p. 126, 129-130.

New equipment in the openhearth department. Photographs. (D2, ST)

241-D. Monolithic Linings in Furnace Spouts. Working Conditions Improved at Armco Steel Corp. V. W. Jones. **Monolithic Linings Successful at Crucible Steel Co.** G. M. Burrier. **Practice Adopted at Bethlehem Steel Co.** J. C. MacNeill. *Journal of Metals*, v. 5, July 1953, p. 877-880.

Experiences with monolithic refractory-lined spouts. Photographs. (D9)

242-D. Open Hearth Slag Removed Economically by Blasting. J. O. Dague. *Journal of Metals*, v. 5, July 1953, p. 881-883.

Procedures, advantages and disadvantages. Photographs. (D2)

243-D. Vancouver Steel Co., Ltd., Uses Mullite Roofs on Electric Furnaces. G. R. Heffernan. *Journal of Metals*, v. 5, July 1953, p. 884-885.

Physical properties and tests made on mullite roofs. (D5, B19)

244-D. Further Studies of the Tuyere Zone of the Blast Furnace. J. B. Wagstaff. *Journal of Metals*, v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 895-902.

Raceway in front of the tuyere of the blast furnace was studied quantitatively and a correlation obtained for the penetration of the blast. Some evidence is presented for the height and width of the raceway which suggests that all the raceways of a furnace overlap. Size of the coke in this zone was measured photographically during normal operation and results given. Graphs, tables. (D1)

245-D. Hydraulic Arc Furnace Electrode Control. *Metallurgia*, v. 47, June 1953, p. 291, 294.

Principles of control and details of an Italian system. Photographs. (D5)

246-D. Chromium-Nickel Steels Alloyed With Nitrogen. *Metal Progress*, v. 63, June 1953, p. 170-172. (Translated and condensed by N. H. Polakowski from "The Problem of Making Nitrogen-Alloyed Chromium-Nickel Austenitic Steels", by V. I. Prosvirin, N. S. Kreshtshanovskiy, and R. P. Zaletayeva, *Liteynoe Proizvodstvo*, no. 9, 1952, p. 22-23.)

Investigation of maximum amount of N_2 that can be absorbed by the steel without impairing quality of the ingot or casting, ratio of N_2 in the charge to that retained in solid solution, and loss of N_2 in the liquid steel as a function of the melting procedure. (D general, AY)

247-D. Steam From Steel. Robert W. Worley and Harold J. Bentson. *Power Engineering*, v. 57, July 1953, p. 54-57.

Use of blast-furnace gas as fuel for steam and power generation. Diagrams, photographs. (D1, ST)

248-D. Blast Furnace Modernization Program Solves Air and Stream Pollution Headache. *Steel Equipment & Maintenance News*, v. 6, May 1953, p. 12-14.

Illustrates new facilities. (D1, ST)

249-D. Properties of Vacuum-Melted Steels Containing 25% Chromium. J. Hochmann. Henry Brutcher Translation 2981, 3 pages.

Previously abstracted from *Revue de Métallurgie*. See item 22-D, 1952. (D8, Q general, R2, SS)

250-D. Influence of Slag Control Upon Gas Flow in the Blast Furnace. W. Wolf. Henry Brutcher Translation 2994, 7 pages. (From *Stahl und Eisen*, v. 72, 1952, no. 13, p. 777-778.)

How poor burden conditions resulting in blast furnace incrustation can be remedied. Graphs. (D1, Fe)

251-D. Reduction of Magnetic Iron Oxides in Mixture With Nickelous and Cobaltous Oxides. V. I. Arkharov, A. K. Varskaya, M. G. Zhuravleva, and G. I. Chufarov. Henry Brutcher Translation 3027, 8 pages. (From *Doklady Akademii Nauk SSSR*, v. 87, 1952, no. 1, p. 49-52.)

Study of the reduction of magnetic FeO in a mixture with CoO and NiO. Graph, table. 4 ref. (D general, Fe)

252-D. (German.) Electrical Resistance and Voltage Measurements Between Molten Iron and Furnace Linings of Refractory Clay, Corundum, and Magnesite and Measurements on Formation of Thermal Chains in Such Oxides. Wilhelm Anton Fischer and Rudolf Schäfer. *Archiv für das Eisenhüttenwessen*, v. 24, no. 3-4, Mar.-Apr. 1953, p. 105-111.

Experiments carried out in high-frequency and Tamman furnaces. Emf values are explained by reduction of crucible material. Graphs, diagrams. 14 ref. (D6, Fe)

253-D. (German.) Melting Loss of Alloying Elements During Oxygen Refining in the Basic Electric-Arc Furnace. Eberhard Pachaly. *Stahl und Eisen*, v. 73, no. 8, Apr. 8, 1953, p. 461-469.

Alloying, especially of Ni, was facilitated by O_2 enrichment. W, V, Ni, Mo, Cu, and Co remain in the bath longer. Graphs, tables. 12 ref. (D5, Ni, W, V, Mo, Cu, Co)

254-D. The Manufacture of Silicon Capped Steel. Albert Lami. *American Iron and Steel Institute, Regional Technical Meetings*, 1953, p. 151-163.

Why capped steels are preferred to rimmed steels. Advantages. Photographs (D9, CN)

255-D. A Study of the Premature Cracking of Iron Ingot Molds. Richard E. Kerr. *American Iron and Steel Institute. Regional Technical Meetings*, 1953, p. 215-240.

Investigation into major cracking of the bottletop 30 × 48-in. mold. Graphs, photographs. 20 ref. (D9, CI)

256-D. Danger Zones in a Blast Furnace Lining. R. B. Snow and W. C. Allen. *American Iron and Steel Institute. Regional Technical Meetings*, 1953, p. 253-324.

Some of these zones, literature regarding them, and data obtained in recent investigations. Tables, photographs, micrographs diagrams. (D1)

257-D. Blast Furnace Charged With Belt Conveyors at the Societe John Cockerill Works in Seraing. L. Halbrecq. *Blast Furnace and Steel Plant*, v. 41, July 1953, p. 743-750.

Expansion of the plant and installation of new systems. Photographs, diagrams. (D1)

258-D. Permeability of Blast Furnace Burdens. Paul B. Stubbs and Robert L. Stephenson. *Blast Furnace and Steel Plant*, v. 41, July 1953, p. 772-775.

Equipment used, effect of air velocity, evaluation of coke, and beneficiated burden materials sizes. Diagrams, graphs. (D1)

259-D. Steel. Austrians High on Oxygen. *Iron Age*, v. 172, July 23, 1953, p. 63.

Modified bessemer method to make oxygen steel. (D3)

260-D. Steelmaking Reactions. II. Sulphur, Phosphorus and Carbon. P. T. Carter. *Iron & Steel*, v. 26, July 1953, p. 339-346.

A review of slag-metal reactions, compares laboratory and works data. 49 ref. (D general, P12)

261-D. Reduction of Iron Oxides With Lignite. C. V. S. Ratnam. *Journal of Scientific & Industrial Research*, v. 12B, May 1953, p. 209-211.

Reduction of ferric oxide to metallic iron using four forms of lignite and a coconut-shell charcoal. Influence of reducing agent, its ratio (ratio of the amount used to that required theoretically) and temperature of reduction. (D8, Fe)

262-D. (French.) Improving the Bottoms of Basic Bessemer Converters. The Use of Dolomite and Tarred Dolomite. G. Naeser. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques*, v. 10, no. 5, 1953, p. 755-764.

Baking temperature, grain surface activation, and mixing temperature of tar and dolomite. Effect of baking on bricks and bottoms. Experimental arrangement. (D3)

263-D. (French.) Conversion of Open-Hearth Furnaces to Mazut Firing. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques*, v. 10, no. 5, 1953 p. 805-814.

Results obtained in various French plants. Experimental conditions and advantages of the use of heavy oil derivatives. (D2)

264-D. (French.) A New Electrothermic Process for Producing Pig Iron. G. Zuliani. *Journal du four Electrique*, v. 62, no. 1, Jan.-Feb. 1953, p. 25-27.

Lubatti electric furnace which simplifies the method. Diagram. (D8, CI)

265-D. (Italian.) Chemical-Physical Aspects of the Deoxidation of Steel. Felice De Carli. *Metallurgia Italiana*, v. 45, no. 3, Mar. 1953, p. 100-109.

Graphs, tables. 19 ref. (D general, P12, ST)

266-D. (Russian.) Method of Calculating Symmetrical Operating Conditions of Arc Furnaces. R. I. Karaev. *Elektrichestvo*, no. 10, Oct. 1952, p. 38-44.

Method of calculating circuits with the consideration of nonlinearity. Formulas for computing current and power of 1 and 3-phase furnaces. Graphs, formulas. 4 ref. (D5)

267-D. Rolling of Thin Sheet From Molten Cupola Iron. V. Gudrych. Henry Brutcher Translation 2991, 3 pages. (From *Svet Prace* (Prague), Jan. 10, 1952).

Compares cast iron sheet with steel sheet for cost and resistance to corrosion. Possibilities of paint coating, hot galvanizing, and fire enameling of cast iron sheet. (D9, R general, L16, L26, CI, CN)

E

Foundry

375-E. Outstanding Opportunities for the Foundry Industry. James H. Smith. *American Foundryman*, v. 23, June 1953, p. 42-47.

Trends which may revolutionize the foundry industry. Photographs. (E general)

376-E. A Modernized Small Foundry. *Canadian Metals*, v. 16, June 1953, p. 30-32.

How careful preliminary study of similarized installations led to the modernization and improvement of functional layout without interrupting production. (E general)

377-E. Centrifugal Casting in a Sand Mould. L. J. LeBlanc. *Canadian Metals*, v. 16, June 1953, p. 34, 36.

Production of soil pipe which is less brittle than that cast in permanent molds. Diagrams. (E14, CI)

378-E. Cupola Melting of Grey Iron. Some Consideration of Fluxes. D. A. Dodson. *Canadian Metals*, v. 16, June 1953, p. 38, 40.

Methods of flux treatment. (E10, B21, C1)

379-E. Zirconium Silicate. Its Use in Foundry Moulds. *Ceramics*, v. 5, Apr. 1953, p. 67-70.

Effect on castings, core mixes, and green sand molds. (E19)

380-E. Tin and Leaded-Tin Bronzes. Harold J. Roast. *Foundry*, v. 81, July 1953, p. 94-97, 229-230.

Properties of various tin and leaded-tin bronze alloys and foundry practice. (E general, Cu, Sn)

381-E. Castings. A Material for Ammunition. Frank E. Shumann. *Foundry*, v. 81, July 1953, p. 88-93.

Foundry techniques were successfully adapted to the production of a variety of steel and malleable iron shells. Special requirements in producing castings and typical product examples. Photographs. (E general, CI)

382-E. Effects of Vibration During Solidification of Castings. W. Rostoker and M. J. Berger. *Foundry*, v. 81, July 1953, p. 100-105, 260-265.

Effect on grain size and growth and separation of eutectic compounds. Micrographs. 9 ref. (E25, Cu, Al)

383-E. Coremaking Speeded by Use of Heated Corebox. W. M. Peterson. *Foundry*, v. 81, July 1953, p. 106-107, 232.

Cores are blown and baked in one operation by use of electrically heated corebox and fast setting sand mixture. Photographs. (E21)

384-E. Conventional Equiment Used in New Shell Molding Process. *Foundry*, v. 81, July 1953, p. 169-170.

Process which utilizes normal foundry equipment and drying oil binders in the production of a form of shell mold. Diagrams. (E16)

385-E. Shell Molding Comes of Age. A. J. Bzdula and H. A. Taylor. *General Electric Review*, v. 56, July 1953, p. 38-41, 59.

The process illustrated. (E16)

386-E. Where Does Shell Molding Fit in Your Parts Picture? H. S. Shroka. *Iron Age*, v. 171, June 18, 1953, p. 154-157.

Process and problems encountered in its adaptation. Photographs. (E16)

387-E. Making Light Alloy Castings in Shell Moulds. *Machinery* (London), v. 82, June 5, 1953, p. 1041-1048.

Techniques for Al and Au castings varying widely in design, weight, size, and application. Photographs. (E16, Al, Au)

388-E. Production of Zinc Alloy and Aluminium Die Castings for Lucas Motor Car Accessories. *Machinery* (London), v. 82, June 26, 1953, p. 1206-1214.

Equipment and methods of production. (E13, T21, Zn, Al)

389-E. Permanent-Mold Gray-Iron Castings. Edward C. Hoenicke. *Mechanical Engineering*, v. 75, July 1953, p. 549-550.

Types of castings, tolerances, and physical and mechanical properties. (E12, P general, Q general, CI)

390-E. Diecastings and Extruded Sections. H. K. Barton and L. C. Barton. *Mechanical World and Engineering Record*, v. 133, June 1953, p. 250-253.

An evaluation of the respective merits of die castings and extruded sections in a variety of applications. Diagrams. (E13, F24)

391-E. Metal Casting Methods. I. Some General Considerations. II. Centrifugal Casting. J. B. McIntyre. *Metallurgia*, v. 47, no. 283, Apr. 1953, p. 179-182; May 1953, p. 231-236.

Methods employed in the production of shaped castings and ingots for subsequent working. Centrifugal casting process and its application to horizontal and vertical axis machines. Production of pipes, cylinder liners, gear blanks, and internally chilled hollow phosphor bronze sticks. Diagrams. 14 ref. (E14, Cu, CI)

392-E. New A.P.V. Factory and Foundries. Expansion Needs Met by Move to Crawley. *Metallurgia*, v. 47, June 1953, p. 295-299.

Layout and equipment, including sand plant, core shop, nonferrous and stainless steel foundries, and testing and control. Photographs. (E general, S general, SS, EG-a)

393-E. Gold, Silver and Jewelry Industries. Report on Research Progress 1951-52. *Metallurgia*, v. 47, June 1953, p. 311-312.

Sand casting of Ni-Ag, investment casting, lustrous metallic surfaces on costume jewerly, electrogilding, anodized Al badges, and color of metals. (E11, E15, L19, Ni, Ag, Au, Al)

394-E. Sealing Porous Castings by Impregnation. *Overseas Engineer*, v. 26, June 1953, p. 381.

Process for effectively sealing ferrous and nonferrous castings by the vacuum impregnation method. (E25, Cu, Al, CI)

395-E. Mass Production Plus Easy Finishing by Die Casting. *Precision Metal Molding*, v. 11, July 1953, p. 29.

Production of oiler parts. (E13, Zn)

396-E. Shell Molding vs. Conventional Sand Casting. Some Dramatic Cost Comparisons. *Precision Metal Molding*, v. 11, July 1953, p. 32-33, 74.

Compares production costs of two small iron castings. Photographs. (E16, E11, CI)

397-E. Forward, Backward—Start, Stop. F. Shires. *Precision Metal Molding*, v. 11, July 1953, p. 34, 70.

Use of plaster molds for brass castings. (E16, Cu)

398-E. Use of Steel Insert Gives Die Casting With a "Backbone". *Precision Metal Molding*, v. 11, June 1953, p. 35, 84.

Reinforced Al die castings for pins which join vertical members of a pipe scaffolding. (E13, Al, CN)

399-E. Small Run Replicas Produced by Slush Castings. *Precision Metal Molding*, v. 11, July 1953, p. 36-37, 72.

Describes process. Photographs. (E16)

400-E. The Extra Values of Small Die Castings. J. R. Schushardt. *Precision Metal Molding*, v. 11, June 1953, p. 38-39, 85-86.

Why small die castings are frequently less costly than screw machine or stamped pieces. Photographs. (E13)

401-E. Investment Castings in Special Typesetting Machine Save Machine Tool Time. *Precision Metal Molding*, v. 11, June 1953, p. 40-41, 78-79.

Investment castings for use in the "Intertype Fotosetter". Photographs, diagrams. (E15, Cu, TS)

402-E. One-Piece Casting With Cored Undercut. *Precision Metal Molding*, v. 11, June 1953, p. 42.

A permanent mold cast frame for house numbers. (E12)

403-E. Here Are Two Ways a Manufacturer of Dial Telephones Meets Cumulative Tolerances. *Precision Metal Molding*, v. 11, June 1953, p. 44-45.

Die cast Zn vs. drawn brass and sintered gear vs. machined rod. (E13, H15, Zn, Cu)

404-E. Low Contact Resistance With an Aluminum Die Casting. *Precision Metal Molding*, v. 11, July 1953, p. 44, 46.

Castings in a 4-way electrical switch. (E13, T1, Al)

405-E. Mechanized Shell Mold Casting. *Precision Metal Molding*, v. 11, June 1953, p. 47.

New shell molding machine. (E16)

406-E. Rigid Structure: Basic Design Factor in Camera Construction. *Precision Metal Molding*, v. 11, June 1953, p. 48, 50, 85.

Die castings used in the "Polaroid Camera". (E13)

407-E. Let Die Castings Help Keep Costs in Line. Allen G. Gray. *Steel*, v. 133, July 6, 1953, p. 106-110, 163-164.

How Zn and Al die castings have improved quality and lowered cost. Properties, finishability and stability. Photographs, tables. (E13, Al, Zn)

408-E. Precision Investment Castings. Curtis L. Graversen. *Western Machinery and Steel World*, v. 44, June 1953, p. 73-76.

Describes and illustrates process. (E15)

409-E. Melting Trials in an Acid-Lined and a Basic-Lined Cupola Under Comparable Conditions. E. Piwowarsky and H. Schmidt. Henry Brutcher Translation 2992. 20 pages. (From *Die Giesserei. Technischewissenschaft. Beihefte*, 1952, no. 6-8, p. 261-271.

Series of trials to determine the temperatures, melting losses, and slag compositions with different cupola linings. Tables, graphs. 10 ref. (E10, CI)

410-E. (German.) **Analysis of Losses in Cold and Hot-Blast Cupola Furnaces.** G. Clas and J. Schleissner. *Giesserei*, v. 40, no. 8, Apr. 16, 1953, p. 190-193.

Compares reactions and production on both types of furnace. (E10, CI)

411-E. (German.) **Work of REFA in Model Construction.** F. Lamm. *Giesserei*, v. 40, no. 8, Apr. 16, 1953, p. 193-203.

A wooden model of a casting mold was subjected to a practical REFA (National Commission for Study of Work) study to get correct price figures. Tables. Ref. (E19)

412-E. (German.) **Productivity, Management, and Managerial Efforts in German Foundry Practice.** E. Piwowarsky. *Giesserei*, v. 40, no. 8, Apr. 16, 1953, p. 203-210.

Measures dealing with workers and management. Graphs. 10 ref. (E general, A5)

413-E. Precision Casting. *Aircraft Production*, v. 15, July 1953, p. 253-257.

Production of complex parts in Nimonic alloys. Photographs. (E15, Ni, CI)

414-E. Maintenance in the Foundry. T J. Glaza. *American Foundryman,* v. 24, July 1953, p. 40-44.

Reduction of maintenance costs and importance of preventive and corrective maintenance. Photographs. (E general)

415-E. Dietert Process for Precision Molds. *American Foundryman,* v. 24, July 1953, p. 50-51.

Molding materials and baking cycle. Photographs, diagrams. (E19)

416-E. The Influence of Molding Materials on the Incidence of Hot Tearing. I. The Influence of Molding Materials on Hot Tearing. II. J. M. Middleton. *American Foundryman,* v. 23, June 1953, p. 67-74; v. 24, July 1953, p. 60-66.

Technique developed for determination of hindrance to contraction of a steel casting offered by various molding media. Graphs, tables, micrographs. (E19, E25, CI)

417-E. High Efficiency Brass Melting in Low-Frequency Furnaces. G. N. Landis. *American Foundryman,* v. 24, July 1953, p. 72-73.

Practical method for determining correct cross-sectional area of the channel which forms the one-turn secondary winding. Diagrams. (E10, Cu)

418-E. The Flow of Moulding Sand. J. Gittus. *British Cast Iron Research Association,* v. 4, June 1953, p. 560-567.

"Flowability" property of sand. Tables, graphs. (E18)

419-E. The Mechanical Clamping of Shell Moulds. D. A. Taylor. *British Cast Iron Research Association,* v. 4, June 1953, p. 568-570.

Method consisting of placing shells in pneumatically operated clamp before casting. Diagram, photographs. (E16)

420-E. Hot-Metal Receivers for Iron Foundries. *Engineering,* v. 176, July 1953, p. 27.

Use to improve performance of normal cupola. Diagrams, photograph. (E10, Fe)

421-E. Norwegian Vanadium-Titanium Pig Iron. J. Sissener. *Foundry Trade Journal,* v. 95, July 2, 1953, p. 5-6.

Characteristics of the alloy and its benefits to cast products. Graphs. (E general, CI)

422-E. Foundry Practice at Fraser & Chalmers. A W. Bartlett. *Foundry Trade Journal,* v. 95, July 9, 1953, p. 51-52, 64.

Melting and casting procedures for producing turbine parts. Photographs. (E general, CI)

423-E. How Shell Molding Process Simplifies Foundry Art. Alfred E. Green. *Industrial Gas,* v. 31, June 1953, p. 10, 20-22.

Fundamental operation of this foundry practice which offers the advantages of greater production, better castings, and closer tolerances. (E16)

424-E. How to Improve Carbon Pickup in Foundry Iron. Eugene Fry. *Iron Age,* v. 172, July 16, 1953, p. 140-141.

Advantages of using a new high-carbon coke. (E10, CI)

425-E. Complex Aluminum Part Successfully Shell Molded. R. V. Heath. *Iron Age,* v. 172, July 23, 1953, p. 124-128.

Process and results, including use of Al and Mg matchplates. Photographs. (E16, Al, Mg)

426-E. Shell Moulding. Present Position and Techniques. D. N. Buttrey. *Iron & Steel,* v. 26, July 1953, p. 363-364, 368.

Characteristics and basic operation of the process. (E16)

427-E. A High-Production Process for the Manufacture of Cast Iron Gutters. *Machinery* (London), v. 83, July 10, 1953, p. 57-58.

Operations. Photographs. (E11, CI)

428-E. A Practical Approach to Casting Design. Robert J. Franck. *Product Engineering,* v. 24, July 1953, p. 192-195.

Use of experimental stress analysis and scale models to simplify and improve design of critical steel castings. Photographs. (E17, Q25, CI)

429-E. Automatic Foundry Nears Reality. Leonard J. Bishop. *Steel,* v. 133, July 13, 1953, p. 98-100.

How shell molding machines tied in with other modern handling equipment make possible volume production of quality castings with low manpower requirements. (E16)

430-E. (French.) The Vitality of Clay in Foundry Sand. Pierre Nicolas. *Fonderie,* no. 87, April 1953, p. 3392-3400.

Various properties of foundry sand as related to the type of clay content. Research on new sand and choice of sand for regeneration. Diagrams. (E18)

431-E. (French.) The Effect of Temperature on Foundry Clays. Jacques Graviche. *Fonderie,* no. 87, Apr. 1953, p. 3400-3402.

Experiments on kaolitic and bentonitic foundry clays. Graphs. (E18)

432-E. (French.) Mold Cars. *Fonderie,* no. 87, Apr. 1953, p. 3403-3407.

Various car constructions. Diagrams. (E19)

433-E. (Hungarian.) Two New Processes for the Modification of Cast Iron. Béla Körös. *Kohaszati Lapok (Ontode),* v. 3, no. 12, Dec. 1952, p. 285-286.

Turbovski's process of modifying white iron by adding 20-30% molten gray iron and Ebarski's modification using alternate charges in the cupola. **(E10, CI)**

434-E. (Swedish.) Rate of Combustion in the Cupola. Wolfgang von Preen. *Gjuteriet,* v. 43, no. 2, Feb. 1953, p. 25-28.

Development of a formula based on the heat balance which permits the calculation of combustion rate. Graphs, diagrams. (E10)

435-E. (Swedish.) Cost Control and Cost Reduction in Foundries. Bo Casten Carlberg. *Gjuteriet,* v. 43, no. 2, Feb. 1953, p. 29-37.

Importance of cooperation between production and cost departments, and prompt and accurate calculations. Diagrams, graphs. (E general)

436-E. (Swedish.) Use of Pitch in Molding Sand. Olof Carlsson. *Gjuteriet,* v. 43, no. 3, Mar. 1953, p. 47-52.

The effect of pitch and coal dust on the properties of molding sands at different moisture contents. Graphs, diagrams, tables. (E18)

437-E. (Swedish.) A Study of an Electric Foundry Drying Stove. Sixten Ryden. *Gjutereit,* v. 43, no. 4, Apr. 1953, p. 61-68.

How drying is influenced by the percentage of drying stock in the stove, velocity of gases, and amount of fresh air admitted. Photographs, tables, graphs, diagrams. (E19)

438-E. (Swedish.) Standards for Big Molding Boxes. *Gjutereit,* v. 43, no. 4, Apr. 1953, p. 69-76.

Proposes that flask parts without bars, flask sides, flask parts with bars, and bar grids be standardized. Diagrams, tables, graphs. (E19)

F

Primary Mechanical Working

169-F. Forge With All-Hydraulic Control. F. H. Towler and J. M. Towler. *American Machinist,* v. 97, July 6, 1953, p. 154-155.

Direct hydraulic control on a forging press installed in Sweden is reported to give almost instantaneous reversal with speeds up to 100 strokes per min. Diagrams. (F22)

170-F. New Method Speeds Calculations for Forging Dies. *Iron Age,* v. 172, July 2, 1953, p. 138-141.

Calculation of profiles of upsetting dies and visualization of material flow in forging operations simplified by a graphical process. Diagrams. (F22)

171-F. Design and Practices of the Semi-Continuous Strip Mill. Harold H. Warnock. *Iron and Steel Engineer,* v. 30, June 1953, p. 57-60; disc., p. 60-61.

Equipment. (F23)

172-F. The Reversing Hot Strip Mill. A. F. Kenyon. *Iron and Steel Engineer,* v. 30, June 1953, p. 62-70.

Typical mill installations, electrical equipment, and operation. Photographs. (F23)

173-F. Lubricants for Drawing Metals. Allen A. Brown. *Iron and Steel Engineer,* v. 30, June 1953, p. 96-100; disc., p. 100-104.

Fundamental requirments of lubricants and role played by the fatty oils and their derivatives as drawing lubricants or as components of such lubricants. (F1, G21)

174-F. Armco Starts Operation on New 80-In. Hot Strip Mill at Its Ashland Plant. *Iron and Steel Engineer,* v. 30, June 1953, p. 115-116.

Separate units of the mill. Photographs. (F23)

175-F. Titanium. Developments in Forging Methods. George T. Fraser. *Light Metal Age,* v. 11, June 1953, p. 14, 37.

Billet handling and annealing. (F22, J23, Ti)

176-F. Potentialities of Powerful Forging Presses. *Machinery Lloyd* (Overseas Ed.), v. 25, June 1953, p. 99, 101-104.

Development and application of large presses in Great Britain and U. S. Installation of a 12,000-ton press in a British company. Photographs. (F22)

177-F. Induction Heating of Aluminium Alloy Billets at Mains Frequencies. R. H. Barfield. *Metallurgia,* v. 47. June 1953, p. 305-306.

Possibilities and limitations of line frequencies. Factors governing design of equipment. (F21, J2, Al)

178-F. Giant Forgings for Giant Presses. *Metal Progress,* v. 63, June 1953, p. 82-83.

Forging a 145-ton column section for a 50,000-ton press. Pictorial story. (F22, CN)

179-F. Forming of Aluminum. *Metal Progress,* v. 63, June 1953, p. 166, 168, 170.

Digest of paper by E. V. Sharpnack, Jr. Previously abstracted from *American Machinist.* See item 120-F, 1953. (F29, G2, Al)

180-F. Planning Reduces Forging Costs. Less Wastage of Metal by Study of Forging Methods. F. Emanuel. *Metal Treatment and Drop Forging,* v. 20, June 1953, p. 253-255, 252.

Forging methods which allow use of metal ordinarily wasted. Diagrams. (F22)

181-F. New Non-Scaling Reheating Furnace. *Metal Treatment and Drop Forging,* v. 20, June 1953, p. 281-282.
Application in the drop forging industry. (F21)

182-F. Fabrication of Silver Wire. Fred M. Carter. *Wire and Wire Products,* v. 28, June 1953, p. 579-581, 630.
General description of working methods used in industry for the preparation of fine Ag wire of all sizes. Photographs. (F28, Ag)

183-F. Small Rolling Mills Designed With Heavy Machine Features. *Wire and Wire Products,* v. 28, June 1953, p. 586, 629-630.
Rolling mills of interest to manufacturers of jewelry, slide fasteners, small machine parts, and other applications where close tolerances are an objective. (F23)

184-F. (German.) **Solved and Unsolved Problems of Mechanical Aspect of Blooming Mills.** Georg Leder. *Stahl und Eisen,* v. 73, no. 8, Apr. 8, 1953, p. 470-481.
Development of blooming mills in Germany. Advantage of passing ingot through rollers bottom end first. Innovations with roller-feed tables, step rollers, and geared devices. Photographs, diagrams. (F23, ST)

185-F. (German.) **Ordering and Acceptance of Soaking Pits.** Helmut Kallenbach. *Stahl und Eisen,* v. 73, no. 8, Apr. 8, 1953, p. 481-485.
Specific heat consumption and hourly output, heat absorption capacity, consumption during idling, heat recovery, control of furnace pressure, gas-air ratio, and temperature of furnace chamber. 4 ref. (F21)

186-F. The Manufacture of High-Duty Forged Pressure Vessels. J. E. Russell. *Alloy Metals Review,* v. 8, June 1953, p. 2-8.
Materials for and method of manufacture of the vessels. Diagrams, graph, photographs. (F22, CN, AY)

187-F. Manufacture of Pipe as Related to End Use. Richard Aubrey. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 197-213.
Continuous furnace, electric resistance, and submerged arc-weld processes. Photographs, micrographs. (F26, CN)

188-F. How Delco-Remy Cold-Forms Metals. Robert L. Kessler, W. A. Fletcher, and W. P. Bowman. *American Machinist,* v. 97, July 20, 1953, p. 135-142.
How high production rates result from sizing; flat and rotary swaging; coining; and extrusion. Diagrams, graphs, photographs. (F24, F25, G3)

189-F. Willys' Reactivated Aluminum Forge Plant. J. H. Pargeter. *Automotive Industries,* v. 109, July 1953, p. 50-53.
Press and hammer forging of simple and complex parts. Photographs. (F22, A1)

190-F. High Production Rate in Automatic Gas Equipment Heating Heavy Chain Bars for Offsetting. C. S. Thomas. *Industrial Heating,* v. 20, July 1953, p. 1276, 1278, 1280, 1282.
Process for offsetting the bars without cracking. Photographs. (F1, CN)

191-F. Tubing. New Mill Produces Fast. R. M. Lorz. *Iron Age,* v. 172, July 23, 1953, p. 53.
High-speed cold forming and induction welding. (F26, K6, Al, Mg, Cu, Ni, CN)

192-F. Here's Help in Fabricating Brittle Titanium. E. F. Hutchinson. *Iron Age,* v. 172, July 23, 1953, p. 111-115.
Drop and heavy contour die forging, welding, grinding, snagging, and design needs. Photographs, micrographs. (F22, G18, K general, Ti)

193-F. Precision Rolled Thin Strip Offers: 1. Close Tolerances. 2. Superior Surface Qualities. 3. Controlled Grain Size and Hardness. A. I. Nussbaum. *Materials & Methods,* v. 38, July 1953, p. 82-84. (F23)

194-F. Aluminum Cable Sheathing. K. S. Wyatt, *Modern Metals,* v. 9, July 1953, p. 66, 68, 70-71.
Draw-down, continuous extrusion, and strip methods of production. Advantages of replacing Pb with Al. Photograph. (F24, F26, Tl, Al)

195-F. New Mill Turns Out Bigger Copper-Clad Sandwiches. *Steel,* v. 133, July 13, 1953, p. 110, 112, 115.
Improved process reduces cost by cutting down the percentage of Cu alloy wasted in edge-trimming. Strip is three times as wide as it used to be. Photographs. (F29, Cu, ST)

196-F. Rod Mill Combines High Speed-Top Quality. *Steel,* v. 133, July 20, 1953, p. 90, 93.
Fundamental mill components are reorganized to serve as a 3-stand unit. Flowsheet. (F27)

197-F. Cold Extrusion of Steel. A Military Hero in Civilian Garb. Robert F. Huber. *Steel,* v. 133, July 27, 1953, p. 78-82, 109-110.
Advantages and limitations of process. Use with carbon steel. Photographs, diagrams. (F24, CN)

198-F. Larger Aircraft Components Now Forged in West by New 25,000 Pound Drop Hammer. Oscar W. Kaiser. *Western Metals,* v. 11, July 1953, p. 41-43.
Drop hammer used to forge Al parts. Photographs. (F22, Al)

199-F. Bethlehem Triples Wire Mill Capacity With New Machines and Furnaces. *Western Metals,* v. 11, July 1953, p. 60-61.
Describes plant layout and equipment. Photographs. (F28, J general)

200-F. (Swedish.) **Calculation of Roll Force When Cold Rolling Strip.** P. O. Strandell and A. Leufven. *Jernkontorets Annaler,* v. 137, no. 3, 1953, p. 100-114.
Diagrams are given for four grades of steel showing roll force coefficient as a function of thickness ratio in cold rolling strip. Tables, graphs. (F23, CN, SS)

201-F. Cemented Carbide Drawing Dies for Iron and Steel Wire. H. Wedl. *Draht,* (English Ed.) June 1953, p. 38-45.
Design, production, and cause of wear. Micrographs, diagrams, tables. 19 ref. (F28, T5, C-n)

202-F. New Blooming and Billet Mills at the Normanby Park Steel Works of John Lysaght's Scunthorpe Works Ltd. J. A. Peacock. "Conference on the Design of Rolling Mills." British Iron & Steel Research Assoc., London, p. 11-18; disc. p. 19-22.
Equipment, plant layout, and general lubrication system. Diagrams. (F23)

203-F. A Rod and Bar Mill at Guest Keen and Nettlefolds (South Wales) Ltd., Cardiff. G. A. Phipps. "Conference on the Design of Rolling Mills," British Iron & Steel Research Assoc., London, p. 23-28; disc. p. 29-33.
Mill designed to meet a demand for steel free from rolling and surface defects. Diagrams. (F23)

204-F. The Light Section Mill at the Darlington Works of the Darlington and Simpson Rolling Mill Co. Ltd. W. French. "Conference on the Design of Rolling Mills," British Iron & Steel Research Assoc., London, p. 34-38; disc. p. 39-43.
Mill designed for precision rolling at high speed. (F23)

205-F. The New 42-Inch Slabbing Mill at Shotton. J. F. R. Jones. "Conference on the Design of Rolling Mills." British Iron & Steel Research Assoc., London, p. 3-5; disc. p. 6-10.
Mill designed to roll slabs of the full width of the hot strip, thus eliminating the disadvantages of cross rolling. Diagrams. (F23)

206-F. (Book.) **Conference on the Design of Rolling Mills.** 51 p. 1952. British Iron & Steel Research Assoc., 11 Park Lane, London, W.1, England.
Papers are abstracted separately. (F23)

G
Secondary Mechanical Working

238-G. New Snagging Machine Triples Guide Output. William M. Fitzsimmons. *American Foundryman,* v. 23, June 1953, p. 56-57.
Advantages of the machine for foundry grinding. Use with gray iron valve guide castings is described. (G18, CI)

239-G. How To Make Impact Extrusions of High-Strength Aluminum. J. D. Shoemaker. *American Machinist,* v. 97, July 6, 1953, p. 129-140.
Tool design and construction; slug development; lubrication; and production. Photographs, diagrams, graphs. (G5, Al)

240-G. Actual Minutes for Tapping. V. G. Hotchkiss. *American Machinist,* v. 97, June 22, 1953, p. 157, 159.
Tabulated data for recommended speeds and actual minutes for tapping grey iron, malleable iron, and mild steel products. (G17, CI, CN)

241-G. Drawn Parts of Stainless Steel. *Electrical Manufacturing,* v. 52, July 1953, p. 116-121.
Case histories, specific design data, and suggestions for optimum cost, appearance, and performance. Diagrams, photographs. (G4, SS)

242-G. Industrial Application of Metal Spinning. Arnold Hildebrandt. *Finish,* v. 10, July 1953, p. 20-24.
Nontechnical description of manual and automatic spinning operations. Stainless steel parts are used as examples. Photographs. (G13, SS)

243-G. Precision Rolling Forms Jet Seals at High Speed. W. G. Patton. *Iron Age,* v. 171, June 25, 1953, p. 128-130.
Equipment which forms jet seals from high-alloy Ni strip and carbon steel. Photographs. (G11, Ni, CN)

244-G. Butt-Brazed Carbide Tips Improve Tool Life. Walter Jellig. *Iron Age,* v. 171, June 25, 1953, p. 140-142.
Tool life was increased 200% when butt-brazed carbide tips were used to finish SAE 4340 forgings. Photographs. (G17, K8, AY)

245-G. Cool the Coolant for Precise Machining. Wayne Stone. *Iron Age,* v. 172, July 2, 1953, p. 129-132.
Methods of refrigerating the coolant when machining parts for R-1820 Wright radial engines. Photographs, diagrams. (G17)

246-G. Die Pressure in Plane Strain Drawing. Comparison of Experiment With Theory. J. G. Wistreich. *Journal of the Mechanics and Physics of Solids,* v. 1, Apr. 1953, p. 164-171.
Various measurements interpreted. Graphs, tables. (G4)

247-G. Dull Machining Tools Change Aluminum Physical Properties. Robert Wolcott, Jr. *Light Metal Age,* v. 11, June 1953, p. 19, 37.
Results of tests indicate that weaknesses in machined heat treated Al alloy may be result of high temperatures during machining operations. (G17, Al)

248-G. A New Performance Test for Cutting Fluids. J. M. Stokely.

Lubrication Engineering, v. 9, June 1953, p. 137-139.

Laboratory performance test for cutting fluids which correlates well with field performance. It permits rapid evaluation of the effect of additives at various concentrations, as well as direct comparisons of finished cutting fluids. Graphs. (G21)

249-G. Hydraulic Forming Techniques Applied to the Manufacture of Musical Instruments. *Machinery* (London), v. 82, June 26, 1953, p. 1194-1196.

Making white Cu dies and stretch forming reinforcing bands. Photographs. (G9)

250-G. Unconventional Methods of Machining Metal. *Machinery Lloyd* (Overseas Ed.), v. 25, June 20, 1953, p. 97-99, 101.

Electrolytic turning (British) and the spark machining process (Russian). Diagrams, photographs. (G17, Cu, Fe)

251-G. Recent Developments in the Machining of Hard Materials. A. G. Gardner. *Mechanical World and Engineering Record*, v. 133, May 1953, p. 202-204.

Electrosparking, electro - arcing, electrolytic, and ultrasonic processes. (G17, EG-d)

252-G. Thin Metals That Remain Flat After Machining. John C. Wagner. *Metal Progress*, v. 63, June 1953, p. 92-94.

Shows that Al alloy 61S-T6 is satisfactory for production of precision instrument parts. Photographs. (G17, T8, Al)

253-G. Punch Presses and Welders Work Together to Make Wire Products. Howard E. Jackson. *Modern Industrial "Press"*, v. 15, June 1953, p. 34, 38, 42, 44, 46, 48.

Pictorial presentation. (G2, K general)

254-G. Abrasive Belts Get Into Every Nook and Cranny. Jack Durnan. *Precision Metal Molding*, v. 11, July 1953, p. 50-51, 53-55.

Use of abrasive belts to grind and polish Al and Zn die cast parts. Photographs. (G18, Al, Zn)

255-G. Pros and Cons. Carbon Dioxide as a Coolant. John C. Welch, Jr. *Western Machinery and Steel World*, v. 44, June 1953, p. 84-85.

Advantages, quality and quantity used for particular operation, and cost. (G21)

256-G. (German.) New Processes of Surface Finishing by Honing. A. Linek. *Metalloberfläche*, v. 7, no. 5, May 1953, p. A73-A75.

New methods and equipment for finishing machine parts. Photographs. (G19, CN)

257-G. Colossal Press Spearheads Lockheed's Skin Program. Reed B. Scott and R. L. Vaughn. *Machinery* (American), v. 59, July 1953, p. 166-171.

An 8000-ton press for forming Al aircraft parts. Photographs (G1, Al)

258-G. Jet-Engine Aft Frames by Ryan Production Methods. Lawrence M. Limbach. *Machinery* (American), v. 59, July 1953, p. 172-181.

Machining operations on complicated stainless steel part for jet engine. (G17, SS)

259-G. Machining. Theory and Practice. K. G. Lewis and W. Milne. *Machinery (London)*, v. 83, July 10, 1953, p. 69-75, 94.

Effects of alloying elements; machinability of medium carbon alloy steels, stainless steels and cast irons; effect of microstructure on machinability; effect of feed and speed on tool life; machining of Cu, Al, and Mg alloys; and machining conditions. Graphs, tables. (G17, M27, Cu, Mg, Al, CI, SS, CN)

260-G. Working Titanium at North American. Gordon A. Fairbairn. *Machinery* (American), v. 59, July 1953, p. 182-187.

How sheet, bar stock, and forgings are used. Considers machining, cold forming, and heat treating. Photographs. (G17, F22, J general, Ti)

261-G. Stretch Forming Aluminum. E. V. Sharpnack, Sr. *Sheet Metal Worker*, v. 44, July 1953, p. 109.

Action eliminating basic cause of distortion after forming. Diagrams. (G9, Al)

H Powder Metallurgy

62-H. Iron Powder Magnets. *Engineer*, v. 195, May 22, 1953, p. 740-741.

New kind of permanent magnet made from soft ferromagnetic powders. Characteristics of micropowder magnets in comparison with other commercially available magnetic materials. (H11, Fe, SG-n)

63-H. Sintered Steel Bushings Extend Life of Roller Chain. L. H. Whitney and R. Talmage. *Iron Age*, v. 171, June 25, 1953, p. 125-127.

Roller chain with sintered steel bushings is suitable for use where standard roller chain is not or cannot be lubricated properly. (H general, T7, AY)

64-H. An Investigation of Boron Carbide. Frank W. Glaser, David Moskowitz, and Benjamin Post. *Journal of Applied Physics*, v. 24, June 1953, p. 731-733.

Experiments and results of preparing and characterizing boron carbide. Graphs. 12 ref. (H10)

65-H. Phase Diagrams Play an Important Role in Powder Metallurgy. Robert Steinitz. *Journal of Metals*, v. 5, July 1953, p. 891-894.

Use of phase diagrams to tell when two or more materials reach an equilibrium in powder metallurgy. Diagrams. 6 ref. (H general, M24)

66-H. Control in Powder Metallurgy. H. W. Greenwood. *Metal Industry*, v. 82, June 5, 1953, p. 461-462.

Examples of control to indicate their simple but valuable nature. (H general)

67-H. Use Self-Lubricated Sinterings Where You Can't Lubricate. *Precision Metal Molding*, v. 11, July 1953, p. 30-31, 68.

Detailed report of two sintered cams which are subjected to extremely severe operating conditions. Diagrams. (H16)

68-H. No Back Pressure Problem When You Filter With a Bronze Sintering. Robert Caplan. *Precision Metal Molding*, v. 11, July 1953, p. 43, 68-69.

Advantages of sintered bronze filters for refrigerants. (H general, Cu)

69-H. The Effect of Infiltration on Physical Properties of Sinterings. George Stern. *Precision Metal Molding*, v. 11, June 1953, p. 92-102.

Field of iron and steel compacts infiltrated with Cu base alloys. Theory, practice, and economic factors. Variables affecting infiltration, such as composition of the skeleton and infiltrant; effect of time and temperature; and effects of subsequent heat treatments. Micrographs, tables. (H16, Fe, ST, Cu)

70-H. Carbide With a Twist. *Steel*, v. 132, June 29, 1953, p. 92.

Swift, precise method of twisting and bending carbide to fit helical tool bodies. Photographs. (H14, C)

71-H. (German.) Influence of Reduction Temperature of Nickel and Cobalt Compounds on Catalytic Properties of Metallic Catalysts. F. Lihl and P. Zemsch. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, no. 10, 1952, p. 979-985.

Ni and Co powders were prepared by reduction of various compounds. Activity of Ni as catalyst was very sensitive to reduction temperature. Graphs, tables. (H10, Ni, Co)

72-H. Cemented Carbide Tips and Tools. *Iron and Steel*, v. 26, p. 365-368.

Layout, manufacturing procedure, control and production. Diagrams, photographs. (H general, C-n)

73-H. High Strength Precision Iron Powder Parts. William J. Doelker and Harold T. Harrison. *Materials & Methods*, v. 38, July 1953, p. 67-71.

Shows they have excellent surface finish, are successfully produced at high production rates, reduce production and tool costs, and have low scrap loss. Graphs, photographs. (H general, Fe)

74-H. Impregnation of Powder Metallurgy Parts Improves Corrosion Resistance. Wilson N. Pratt. *Steel*, v. 133, July 13, 1953, p. 122-123.

Impregnating powder parts with polyester-type resin, prior to plating. Photographs. (H16, R general)

75-H. (Italian.) On the Effects of Copper and Solid Lubricants on the Dimensional Variations During Sintering of Pure Iron Pieces. Carlo Ghiglieno. *Metallurgia Italiana*, v. 45, no. 4, Apr. 1953, p. 128-132.

Work carried out to study the behavior of sintered parts due to the heating cycle. Components of the mixtures, compression pressure, sintering time, and temperature. Diagrams. Graphs. 3 ref. (H15, H13, Cu, Fe)

76-H. (Russian.) Granulation of Powders by the Rolling Method. S. S. Voiutskii and S. I. Rubina. *Legkaia Promyshlennost*, v. 12, no. 10, Oct. 1952, p. 36-39.

Carbon black was rolled in drums to form granules. No bonding agent was necessary. Advantages of this process. Tables, graph, micrograph, drawing. (H10)

J Heat Treatment

142-J. Unfailing Proof of Heat Treatment. Wayne Martin. *Electrical Manufacturing*, v. 52, July 1953, p. 292, 294.

Method of indicating when a satisfactory heat treating operation has been performed on a part. (J general, Al)

143-J. From Mammoth to Miniature. Albert L. Neudoerffer. *Instrumentation*, v. 6, 2nd qtr., 1953, p. 8-9.

Effective control of hardening contributes to higher quality of bearings. Photographs. (J general, AY, TS)

144-J. Gas Nitrided 4140 Case is Tougher. J. G. Morrison. *Iron Age*, v. 172, July 9, 1953, p. 129-134.

Case hardening technique and mechanical properties. Tables, diagrams. (J28, Q general, AY)

145-J. Double-End Batch Furnaces Speed Heat Treatment of Small Parts. *Iron Age*, v. 172, July 2, 1953, p. 136-137.

Rigid heat treating cycles and program control for treating small carbon-graphite parts. Photographs. (J general)

146-J. Special Furnaces for Heat Treatment of Metals. *Machinery Lloyd* (Overseas Ed.), v. 25, June 20, 1953, p. 182-187.

Types of furnaces for heat treatment of special alloys. Photographs. (J general, Al, Ni, Cr, TS)

147-J. Heat-Treatment Furnace Developments. *Metallurgia*, v. 47, no. 283, May 1953, p. 247-262, 274.

Recent installations for ferrous and nonferrous metals. Reviews progress in furnace design. Photographs. (J general, Cu, Al, ST)

148-J. Automatic Control of Fuel-Air Ratio in Metallurgical Furnaces. Leo Walter. *Metallurgia*, v. 47, June 1953, p. 307-309.

Characteristics of ratio controllers and four typical applications. Diagrams. (J general)

149-J. Structures and Properties of Some Carbo-Nitrided Cases. K. B. Valentine. *Metal Progress*, v. 63, June 1953, p. 97-103.

Four methods of carbonitriding were used with C1024, 4028, 4620, 5120, TS8120, TS81B20, 8620, and 9415 steels. Bending load properties, impact fatigue properties, microhardness of case, and microstructure were then determined. Diagrams, micrographs, tables. (J28, Q general, ST)

150-J. Induction Heating Helps Produce Better Gears. L. G. Miller. *Metal Progress*, v. 63, June 1953, p. 109-110, 179.

Use of a vacuum-tube type induction heater for heat treating gears. (J2, CN)

151-J. To What Extent Does Stress Relieving Occur at 200-300° C? R. Gunnert. *Welding Journal*, v. 32, June 1953, p. 292s-301s; disc. p. 301s.

Series of tests. Graphs, diagrams. (J1)

152-J. On the Use of Alternating Current in the Electromechanical Surface Hardening of Tools and Machine Elements. L. Ya. Popilov. Henry Brutcher Translation 2977, 5 pages. (From *Vestnik Mashinostroeniya*, v. 32, 1952, no. 9, p. 60-61.)

Compares the direct and alternating current electromechanical surface hardening process. Table. (J28, Fe, CN)

153-J. (German.) **Magnetic Regulation of Heat Treatment of Toolsteels in Mass Production.** Helmut Krainer and Ekkehart Krainer. *Archiv fur das Eisenhüttenwesen*, v. 24, no. 3-4, Mar.-Apr. 1953, p. 127-131.

Magnetic properties of toolsteel were tested at various tempering states. Inductive testing is rapid and convenient. Photographs, graphs. 21 ref. (J29, P16, TS)

154-J. Flame Hardening of Cast Iron. M. R. Scott. *American Foundryman*, v. 24, July 1953, p. 52-56.

Process for cast iron and steel used for machine bases, ways, gibs, etc. Photographs, micrographs. (J2, CI)

155-J. Continuous Normalizing, Hardening and Tempering at Kropp Forge Co. *Industrial Heating*, v. 20, July 1953, p. 1264-1266, 1268, 1270, 1272.

Three integrated furnaces for special forgings. Photographs. (J24, J26, J29, AY)

156-J. Production Heat Treatment of Motorcycle Parts. *Industrial Heating*, v. 20, July 1953, p. 1295-1296, 1298, 1300, 1382.

Heat treating furnaces, annealing, inspection, and testing of special parts. Photographs. (J general, AY)

157-J. — Rotary Furnace Features Floating Hearth. R. E Greenawalt. *Industrial Heating*, v. 20, July 1953, p. 1320-1322, 1324, 1326, 1328, 1330.

Hearth construction and operation. Diagram, photographs. (J general)

158-J. Better Heat Treating for Better Bearings. Herb Habart. *Iron Age*, v. 172, July 16, 1953, p. 131-135.

Process which combines freezing and heat treatment of low alloy steels. Micrographs. (J general, AY)

159-J. Efco Heat Treatment Division. *Machinery (London)*, v. 83, July 10, 1953, p. 83-85.

Layout and equipment. Photographs. (J general)

160-J. Annealing Type 414 Stainless Steel Forging. Anthony A. Scafati. *Materials & Methods*, v. 38, July 1953, p. 78-79.

Optimum hardness and machinability can be obtained with 2-stage annealing procedure. Photographs. (J23, SS)

161-J. Comparison of Tests for Hardenability of Shallow-Hardening Steels. G. K. Manning. *SAE Journal*, v. 61, July 1953, p. 30-36.

Based on "Jominy and SAE Hardenability Tests on Seven Shallow-Hardening Steels". A cooperative program among ten laboratories sponsored by SAE Iron and Steel Technical Committee Division V. Graphs. (J26, CN, AY)

162-J. Tool Steels for Press Tools and Shear Blades in Sheet-Metal Fabrication. (Concluded.) R S. Watts. *Sheet Metal Industries*, v. 30, July 1953, p. 553-565.

Hardening and tempering. (J26, J29, T5, TS)

163-J. (Dutch.) **Various Aspects of Gas Carburizing and Carbonitriding.** C. H. Luiten. *Metalen*, v. 8, no. 5, Mar. 14, 1953, p. 91-97.

Processes and conditions affecting them. Diagrams, graphs. (J28)

164-J. (Italian.) **Heat Treatment of Armor Plates for Battleships.** Leopoldo Malvezzi. *Metallurgia Italiana*, v. 45, no. 4, Apr. 1953, p. 133-138.

A review of heat treatment and fabrication of naval armor plate. Diagrams, graphs, photographs, tables. 4 ref. (J general)

165-J. (Russian.) **Mechanism of Artificial Aging of Al-Cu-Mg Alloy.** Iu. A. Bagariatskii. *Doklady Akademii Nauk SSSR*, v. 87, new ser. no. 3, Nov. 21, 1952, p. 397-401.

X-ray structural analysis and microscope methods are used in the study of artificially aged aluminum alloys. Microphotographs. 10 ref. (J27, M27, Al)

166-J. (Book.) **Principles of Heat Treatment. Rev. Ed. M. A. Grossmann.** 303 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.00.

Discusses what happens when steel is heated from room temperature until it is red hot and is then cooled back to room temperature at different rates. (J general, ST)

K

Joining

401-K. Welding Developments. A Review of the Methods Employed for Vauxhall Velox and Wyvern Bodies. *Automobile Engineers*, v. 43, June 1953, p. 247-257.

Equipment for welding automobile parts. Press welding. Photographs. (K general, CN)

402-K. Solderless Wrapped Connections. Introduction. J. W. McRae. **I. Structure and Tools.** R. F. Mallina. **II. Necessary Conditions for Obtaining a Permanent Connection.** W. P. Mason and T. F. Osmer. **III. Evaluation and Performance Tests.** R. H. Van Horn. *Bell System Technical Journal*, v. 32, May 1953, p. 523-610.

Graphs, diagrams, photographs. (K13)

403-K. Welding Quickly Restores Broken Turbine Blades. *Electric Light and Power*, v. 31, June 1953, p. 136-137.

Welding is less expensive and more rapid than replacement with new parts. (K general, AY)

404-K. Modern Pipe Welding Practices. F. C. Fantz. *Industry & Welding*, v. 26, Apr. 1953, p. 37-40, 72-73; May 1953, p. 74-76, 78-79; July 1953, p. 65-68, 70-71.

Advantages of welded structures in modern oil refinery equipment. Various types of pipe connections and flanged joints. Selection of pipe connections for separation of flow and reduction of line area. How welding is used to reinforce nozzle or branch connections and to protect butt-welded joints. Adaptation of submerged-arc method to pipe fabrication. Photographs. (K general, ST)

405-K. 17,680 Feet of Welding. Procedures for Fabricating All-Welded Gasholder. *Industry & Welding*, v. 26, July 1953, p. 33-36, 57.

Shows that all-welded structure is an outstanding example of the flexibility and speed offered to the field of structural fabrication by the arc-welding process. Construction and various types of welds. Diagrams. (K1, CN)

406-K. Unique Spot Welding Set-Up Used to Fabricate Wire Products. *Industry & Welding*, v. 26, July 1953, p. 50-51, 53-54, 56-57.

How the spot welders are used in production of display baskets, racks, and other products made from round wire. Photographs. (K3, ST)

407-K. Oxy-Acetylene Cutting Prepares Special Struts for Fabrication. Clement F. Brown. *Industry & Welding*, v. 26, July 1953, p. 81-82, 84.

Design and fabrication problems of an experimental job requiring two welded strut-type members of low-carbon steel to be used for aquatic application. (K2, G22, CN)

408-K. Flush Welds Withstand Impact Better Than Reinforced Welds. Carl E. Hartbower. *Iron Age*, v. 171, June 25, 1953. p. 136-139.

Investigation of performance of weldments over a wide temperature range and under combined load. Explosive bulge tests were used. (K9, Q6, CN)

409-K. Light Alloy Welding Demonstrated. *Metal Industry*, v. 82, June 5, 1953, p. 469.

"Argonaut" welding in which the W electrode of the argon-arc process is replaced by an Al filler wire which is automatically fed down the gun to the weld inside the protecting argon envelope. (K1, Al)

410-K. Welding Sequences and Uses of Heat. F. H. Dill. *Midwest Engineer*, v. 6, July 1953, p. 3, 11-13.

Welding shrinkage and use of heat to combat it. (K general, J general)

411-K. Welding Army Truck Mufflers. James P. Moss. *Modern Machine Shop*, v. 26, July 1953, p. 130-135.

Fully automatic machine makes hidden arc welds on elliptical ends after subassemblies are prepared by arc, seam, and spot welds on Al coated steel. Photographs. (K1, K2, K3, Al, ST)

412-K. Mass Production in Small Shops. Byron Russell. *Modern Machine Shop*, v. 26, July 1953, p. 136-142.

What can be done if proper consideration is given to all production angles. Use of homemade fixtures for welding and machining. Photographs. (K general, G17)

413-K. Future Problems to Be Faced in the Development of Metallic Arc Electrodes. J. H. Paterson. *Welder,* v. 22, Apr.-June 1953, p. 29-33.

Dilution of weld metal with parent metal; presence of trace elements; rate of solidification and cooling of weld metal; and the standard electrode. (K1)

414-K. The Influence of Lloyd's Register of Shipping on Welding Progress. H. N. Pemberton. *Welder,* v. 22, Apr.-June 1953, p. 38-39.

Part played in development and application of welding in shipbuilding and engineering. (K general)

415-K. The Welding of Equipment in Chromium-Nickel Austenitic Steel. F. H. Keating. *Welder,* v. 22, Apr.-June 1953, p. 61-69.

Development of sigma phase, reduction of corrosion resistance, reducing impact resistance at sub-zero temperatures, welding techniques, heat treatment, and finishing treatments. Micrographs. (K general, SS)

416-K. The Metallurgy of the Welding of Aluminium and Its Alloys. W. I. Pumphrey. *Welder,* v. 22, Apr.-June 1953, p. 70-79.

Study made of the metallurgy of fusion and pressure welding of Al and its alloys. Porosity and cracking are considered. Graphs. (K general CI)

417-K. Atom Apple. Herman C. Phelps. *Welding Engineer,* v. 38, July 1953, p. 23-26.

Welding requirements demanded by a huge metal structure for atomic study. Photographs. (K general)

418-K. Ironwork Just Like New Orleans. T. B. Jeferson. *Welding Engineer,* v. 38, July 1953, p. 30-31.

Welding iron castings to form decorative iron work. Photographs. (K general CI)

419-K. Hosiptal for Sick Refrigerator Units. William C. Henzlik. *Welding Engineer,* v. 38, July 1953, p. 32-34.

Use of oxy-acetylene torches to cut and repair freezing units of refrigerators. Photographs. (K2, G22)

420-K. A Railroad Goes Into Car-Building Business. Clyde B. Clason. *Welding Engineer,* v. 38, July 1953, p. 44-47.

Fabrication of steel gondola cars by submerged-arc and manual arc welding. Photographs. (K1, CN)

421-K. Design of Welded Steel Bridges and Buildings. F. L. Plummer. *Welding Journal,* v. 32, June 1953, p. 489-496.

Advantages of welded construction, steel for welded structures, fabrication procedures, results of research, and examples of welded buildings. Photographs. (K general, T26, CN)

422-K. On the Welding of Titanium Alloys. C.. B. Voldrich. *Welding Journal,* v. 32, June 1953, p. 497-515.

Properties, potentialities, and welding characteristics of Ti with a description of applicable processes. Photographs, graphs, micrographs. (K general, Ti)

423-K. Quality Control of Resistance Welding by Statistical Methods. J. F. Radford and R. K. Waldvogel. *Welding Journal,* v. 32, June 1953, p. 521-526.

Material derived from actual weld sampling is presented to give a case study of the manner in which data may be accumulated for introduction of a control program. Tables, graphs, photographs. (K3, S12)

424-K. Effect of Atmospheric Contaminants on Arc Welds in Titanium. J. C. Barrett, J. R. Lane, and R. W. Huber. *Welding Journal,* v. 32, June 1953, p. 283s-291s.

Effect of gaseous contaminants on the properties of arc welds in Ti. An attempt was made to determine the minimum content of each which would have a detrimental effect on the bend and tensile properties of the weld. Photographs, tables, micrographs. (K1, K9, Ti)

425-K. Strength and Trends of Bolted Assemblies. John S. Davey. *Agricultural Engineering,* v. 34, July 1953, p. 465-467, 471.

Proper use of bolted assemblies. Diagrams, graphs. (K13)

426-K. Availability and Adaptability of Fasteners. Fred C. Ewert. *Agricultural Engineering,* v. 34, July 1953, p. 468-471.

Recent developments, work accomplished by various standardizing bodies, how this work affects agricultural engineers, and fastener trends in the farm equipment industry. 5 ref. (K13)

427-K. Multitransformer Welding Presses. Jack Ogden. *Applications and Industry,* July 1953, p. 202-208.

Welding equipment and process considerations. Diagrams, graphs. (K5)

428-K. Welding Axle Housings in Automatic Machines L. E. Feeney. *Automotive Industries,* v. 109, July 1953, p. 54-55.

Operation of the machines. Photographs. (K1)

429-K. Step Ahead in Automation. Soldering 1000 Leads in One Mechanized Operation. K. M. Lord. *Factory Management and Maintenance,* v. 111, July 1953, p. 108-109.

Dip solder machine. Photographs. (K7)

430-K. Assuring Integrity of Welds in Storage Pipes With Complete X-Ray Inspection. H. P. Prudhomme. *Gas,* v. 29, July 1953, p. 36-38.

X-ray inspection methods and results. Tables, photographs. (K9, S13)

431-K. Watch Out for the "Hose Warts"! *Linde Tips,* v. 32, July 1953, p. 58-59.

Rules for keeping welding hose in good condition. (K2)

432-K. Hints for the Common Welding Jobs. *Linde Tips,* v. 32, July 1953, p. 64-65.

In tabular form. Photographs. (K general)

433-K. Bonding Rubber to Metal. *Modern Metals,* v. 9, July 1953, p. 44.

"Redux" process which employs a phenolic resin and a polyvinyl formal powder. Process can be applied to natural or synthetic rubber. (K11, Al)

434-K. Dripless Solderless Can. *Modern Packaging,* v. 26, July 1953, p. 88-89.

Can for "Lux Liquid Detergent" which features a dripless nozzle and cemented-side-seam. Material is lacquered blackplate. Photographs. (K12, L26, T29, ST)

435-K. Strength of Joints in Titanium Brazed With Several Alloys. L. W. Smith and L. A. Yerkovich. *Product Engineering,* v. 24, July 1953, p. 141-147.

Strength, stress-rupture, and fatigue properties of single and double lap joints of Ti sheet brazed with Ag and Al-base alloys. Both slow and rapid heating techniques were used. Tables, graphs. (K8, Q4, Q7, Q23, Ti, Ag, Al)

436-K. Correct Welding Procedure. I.-III. Lester F. Spencer. *Sheet Metal Worker,* v. 44, Dec. 1952, p. 36-38, 40; Feb. 1953, p. 59-62, 79; Mar. 1953, p. 74, 76-77; Apr. 1953, p. 70-72, 74, 76.

Part 1: Principal joint designs, types of projections, flash butt welding, alignment of surfaces, root openings, and pre and post heating. Part 2: Technique of welding and welding symbols. Part 3: Methods of welding; cause and prevention of poor welds; and welding medium and high-carbon steels. Diagrams, photographs, tables. (To be continued.) (K general, CN)

437-K. Large Coliseum Welded in Shop. *Steel,* v. 133, July 20, 1953, p. 143.

Use of semi-automatic hidden arc-welding outfits and shop jigs for welding structural steel components weighing 67 tons. (K1, T26, CN)

438-K. Oxyacetylene in Paper Mill Maintenance. Dorsey Blalock Thomas. *Tappi,* v. 36, July 1953, p. 38A, 40A, 42A, 44A.

Uses for oxy-acetylene welding and cutting in reclaiming materials, hard facing, and rebuilding production equipment. (K2, G21, L24)

439-K. A Modern Fabrication Shop. The South Works of Ashmore, Benson, Pease & Co. *Welding and Metal Fabrication,* v. 21, July 1953, p. 230-237.

Layout and expansion program. Welding equipment. Photographs, diagrams. (K general, A5)

440-K. Electrodes for Arc Welding Mild and Low Alloy High Tensile Steels. A. T. Roberts. *Welding and Metal Fabrication,* v. 21, July 1953, p. 245.

Description. (K1, CN, AY)

441-K. Applications of Koldwelding. W. A. Barnes. *Wire and Wire Products,* v. 28, July 1953, p. 671-674; disc., p. 719-722.

History of cold welding process and present applications. (K5, Al, Pt, Cu, Ag)

442-K. (Dutch.) **The "Extinction" in A.C. Electric-Arc Welding, Studied With the Aid of the Cathode-Ray Oscillograph.** K. K. Zwart. *Smit Mededelingen,* v. 8, no. 1, Jan-Mar. 1953, p. 22-25.

Part 2: Surveys factors influencing re-ignition and derives formulas to determine frequency of extinction. Graphs, diagrams. (K1)

443-K. (Spanish.) **Arc Welding, an Economic Factor in the Reconstruction of Streetcar Rolling Stock.** Luis Badias Aznar. *Ciencia y Tecnica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 6 p.

Series of welding jobs recently carried out in the reconstruction of streetcar units, with particular reference to the economic aspect. Photographs, tables. (K1, CN)

444-K. (Spanish.) **Influence of the Degree of Deoxidation and the Nitrogen Content of the Metal Deposited in the Arc Welding of Carbon Steels.** Jose Maria Sistiaga. *Ciencia y Tecnica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 22 p.

Chemical and metallographical study. Research methods and results. Micrographs, tables, diagrams. 48 ref. (K1, CN)

445-K. (Spanish.) **Proposed Standard Tests for Classifying Electrodes for the Electric-Arc Welding of Structural Steels.** *Ciencia y Technica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 6 p.

Purports to unify testing methods of above electrodes with respect to preparing test pieces, homogeneous impact tests, coating, and base metal. Diagrams, tables. (K1, CN)

446-K. (Spanish.) **Study of the Welding of a Cr-Mo Ferritic Steel Intended for a Transfer Line in Petroleum Refining.** M. de Miro Ramonacho and J. L. Zuloaga. *Ciencia y Tecnica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 5 p.

Studies with respect to chemical analysis, electric-arc welding, metal-

lographic examination, mechanical tests, and corrosion. Macro and micrographs.
(K1, M general, Q general, R general, AY)

447-K. (Spanish.) **The Concept of Physical Metallurgy in Modern Welding.** L. Pottecher. *Ciencia y Tecnica de la Soldadura*, v. 3, no. 10, Jan.-Feb. 1953, 10 p.
The concept as an amplification of metallography due to new methods of study such as X-rays and α-rays, and the special case of welding processes. Diagrams.
(K general)

448-K. (Spanish.) **Designs for Welded Constructions.** F. Koenigsberger. *Ciencia y Tecnica de la Soldadura*, v. 3, no. 10, Jan.-Feb. 1953, 8 p.
Advantages and limitations. Photographs, tables. (K general)

449-K. (Spanish.) **Electrowelded Structures.** R. Gil Alfaro. *Ciencia y Tecnica de la Soldadura*, v. 3, no. 10, Jan.-Feb. 1953, 8 p.
Construction, design, and fabrication by this process. Diagrams. (K6, CN)

450-K. (Spanish.) **Influence of the Addition of Titanium and Beryllium to the Deposited Metal in the Welding of Al-Mg Alloyed Metal Pieces Made by the "Argonarc" Process.** A. Revuelta. *Ciencia y Tecnica de la Soldadura*, v. 3, no. 10, Jan.-Feb. 1953, 20 p.
Prevention of a coarse columnar structure in Al alloys and oxidation of Mg in Mg alloys. Micrographs, tables. 14 ref. (K1, Ti, Be, Al, Mg)

451-K. (Spanish.) **Welding Text. I. Oxyacetylene Welding.** *Ciencia y Tecnica de la Soldadura*, v. 3, no. 10, Jan.-Feb. 1953, 14 p.
General study. Diagrams, tables. (K2)

452-K. (Book.) **WelDesign Manual.** Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio. $10.
Design system. Data, charts, nomographs, tables, cost calculator, process selection guides, and time charts instructions for using the manual for study; cost calculator slide rule; and a set of weld standards are included. (K general)

453-K. (Book.) **Welding Review Year Book, 1953.** J. V. Brittain, editor. 309 p. Engineering Trader Ltd., Morley House, 26-30 Holborn Viaduct, London, E.C.1, England. 10s. post net.
Techniques, equipment, and materials. (K general)

454-K. (Book.) **Welding Technology. Ed. 2.** F. Koenigsberger. 341 p. 1953. Cleaver-Hume Press Ltd., 42a South Audley St. London, W.1, England. 25s.
Surveys welding processes, their characteristics and equipment.
(K general)

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Cleaning, Coating and Finishing

399-L. Use of Ion Exchange Resins in Purification of Chromic Acid Solutions. Lloyd Gilbert, W. S. Morrison, and Floyd H. Kahler. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 31-52; disc. p. 52-54.
"Ion exchange unit" for treatment of chromic acid and actual results obtained. Graphs, photographs. (L26, Cr)

400-L. Engineering Aspects of Waste Prevention. D. Milne. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 55-67.
Control of industrial waste by exercise of waste prevention measures within the metal finishing shop. Diagrams. 10 ref.
(L general, A8)

401-L. Some Experiences in Heavy Rhodium Plating. Harold J. Weisner. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 79-96; disc. p. 96-99.
Properties; cleaning and preparation; effect of metal and acids contents; control methods; effect of impurities: and purification of the bath. Graphs, tables. 7 ref.
(L17, Rh)

402-L. An Explanation of Black Nickel Plating. Earl J. Serfass, Ralph F. Muraca, and Walter R. Meyer. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 101-109; disc. p. 109-111.
Theories of immersion blackening and black Ni electroplating (L17, Ni)

403-L. Materials of Construction for a Waste Water Treatment System. Fred G. Brüne. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 113-117.
Selection of the materials used in a plating waste water treatment system. (L17, A8)

404-L. Materials of Construction for Plating Rooms. R. E. Harr. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 119-125.
Materials of construction used in floors; drains; piping systems for acid, alkali, and de-ionized water; exhaust systems; and tanks and tank linings. (L17, T5, Al, SS)

405-L. Plastics as Plating Room Engineering Materials. D. Gardner Foulke. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 127-139; disc. p. 139-140.
Developments in plastics from the engineering aspect of plating operations. Photograph. (L17)

406-L. Vacuum Metallizing Today. J. Gordon Seiter. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 141-147; disc. p. 147-151.
Applications, materials, properties, developments, and advantages. (L25)

407-L. Current Distribution in Barrel Plating. A Statistical Study. William C. Geissman and Robert A. Carlson. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 153-161; disc. p. 161-165.
Investigation to determine the capabilities of the process of barrel Zn plating. Graphs. 6 ref.
(L17, Zn)

408-L. Bright White Brass Plating. R. B. Saltonstall. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 167-174; disc. p. 174-179.
Present status of white brass plating. Graphs. (L17, Zn, Cu)

409-L. A Critical Review of Substitute Finishes. Myron Ceresa. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 181-197; disc. p. 197-199.
Finishes for present and possible future use. Tables. 16 ref.
(L general)

410-L. Special Plating Plant Instrumentation and Apparatus. Frank K. Savage. *American Electroplaters' Society, Proceedings*, v. 39, 1952 p. 203-212; disc. p. 212-213.
A number of interesting special adaptations of more or less unusual instruments in the plating room. Diagrams. (L17, S general)

411-L. Benefits to the Plater of the American Electroplaters' Society Research Program. Earl J. Serfass. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 215-224; disc. p. 224-225.
Evaluation of the results of the AES Research Program. (L17, A9)

412-L. Some Engineering and Economic Aspects of the Disposal of Cyanide Plating Wastes. Barnett F. Dodge. *American Electroplaters' Society, Proceedings*, v. 39, 1952, p. 233-247; disc. p. 247-249.
Investigation to obtain necessary information to make cost analyses. Diagrams. (L17, A8)

413-L. Ford Foundry Cleaning Room Features Planned Efficiency. V. F. Stine. *American Foundryman*, v. 23, June 1953, p. 76-78.
Cleaning room designed to produce high-quality castings with the most modern mechanized equipment in surroundings providing the finest possible working conditions. Photographs. (L10, L12)

414-L. Polyvinyl Chloride Tape Approaches Ideal Material for Pipe Protection. George M. Carter, Jr. and T. J. Skotnicki. *American Gas Journal*, v. 179, July 1953, p. 14-15, 30-31.
Reviews requirements of preventing corrosion, properties of polyvinyl chloride, and application to pipe. (L26, CN)

415-L. Precision Tumbling Produces Fine Finish. Richard Depastina. *American Machinist*, v. 97, July 6, 1953, p. 113-115.
"Slidabrading" process for removing burrs and producing a smooth surface. (L10)

416-L. Ultrasonics. A Sound Method of Cleaning. Ray E. Homan. *American Machinist*, v. 97, July 6, 1953, p. 120-124.
Ultrasonic cleaning offers advantages on hard-to-clean, high-unit-cost items where absolute cleanliness is essential. Photographs.
(L10)

417-L. Abrasives for Tumbling. *American Machinist*, v. 97, June 22, 1953, p. 155.
Tabulated data for abrasive media and additives. (L10)

418-L. Electronic Barrier Against Invisible Dirt. *Canadian Chemical Processing*, v. 37, June 1, 1953, p. 50, 52.
Advantages of the equipment for use when painting automobiles.
(L26)

419-L. Rust Protection for Machined and Finished Parts. *Canadian Metals*, v. 16, June 1953, p. 22, 24.
Plastic, oil, thin film, and solvent types of rust preventatives. Application methods and fields of application. (L26)

420-L. Stauffer Chemical Stops Fan Corrosion With Silver Metallizing. *Chemical Processing*, v. 16, July 1953, p. 104-105.
Use of Ag, Mo, Ni, and Ta to prevent corrosion. Photographs.
(L23, CI, Mo, Ni, Ag, Ta)

421-L. Production - Line Painting Methods. J. T. Pederson. *Electrical Communication*, v. 30, June 1953, p. 84-95.
Painting systems and controls used in finishing metal parts. Photographs. (L26, CN)

422-L. Formation of Immersion Zinc Coatings on Aluminum. W. G. Zelley. *Electrochemical Society, Journal*, v. 100, July 1953, p. 328-333.
Growth of process, corrosion of plated Al, deposition of the Zn film, immersion solutions, and performance of plated Al. Diagrams. 17 ref. (L16, R general, Zn, Al)

423-L. The Mechanism of Electropolishing of Copper in Phosphoric Acid Solutions. I. Processes Preceding the Establishment of Polishing Conditions. J. Edwards. *Electrochemical Society, Journal*, v. 100, July 1953, p. 189C-194C.
Study to determine what conditions prevail at an anode undergoing polishing and how such conditions suppress crystallographic etching and promote smoothing. Tables, diagrams. (L13, Cu)

424-L. Potassium Versus Sodium in Plating and Cleaning Solutions. *Elec-*

troplating and Metal Finishing, v. 6, June 1953, p. 197-200.

Na and K in Ag and cyanide Cu baths and in Cd, Zn, and Au solutions. Considers potassium stannate plating cost and availability. (L12, L17, Ag, Cu, Cd, Zn, Au)

425-L. Protection Against Corrosion of Steelwork in the Chemical Industry. *Electroplating and Metal Finishing*, v. 6; *Metal Spraying*, v. 3, June 1953, p. 228-230. (Translated and condensed from *Chemische Industrie*, v. 4, July 1952, p. 463-464.)

Advantages of using sprayed Zn followed by two coats of vinyl chloride paint. (L23, L26, Zn, ST)

426-L. Finishing Parts for Lighting Fixtures. A. G. Kling. *Industrial Finishing*, v. 29, June 1953, p. 24-26, 28, 30, 32.

Procedure for cleaning and painting. Photographs. (L general, Cu, ST)

427-L. Bright Metal Finishing by Vacuum Metal Evaporation. *Industrial Finishing*, v. 29, June 1953, p. 38-40, 42, 44.

Technique for metallic coating of plastics, textiles, metals, and alloys. Photographs. (L25, Au, Ag, Cu)

428-L. Finishing Slide Projectors. Joseph Plennert. *Industrial Finishing*, v. 29, June 1953, p. 50-52, 54.

Cleaning and painting processes. Photographs. (L general, Al, Zn, CI)

429-L. Here's How Hard Facing Rebuilds Earth Moving Equipment. Robert Dougherty. *Industry & Welding*, v. 26, July 1953, p. 38-40, 71-73.

Application of hard facing to prevent impact and abrasion wear. Photographs. (L24, Q9)

430-L. Priming Paints for Light Alloys. J. G. Rigg and E. W. Skerrey. *Institute of Metals, Journal*, v. 81, June 1953, p. 481-489.

Final results obtained after 3½ years from tests comparing the protective behavior of various paint primers on Al and Mg alloys and steel. Tables, photographs. (L26, Al, Mg, CN)

431-L. New Plating Process Expands Industrial Use of Gold. E. C. Rinker. *Iron Age*, v. 171, June 25, 1953, p. 131-133.

Developments in the process which resulted in lower cost, higher quality, and better durability for Au-plated surfaces. Photographs. (L17, Au)

432-L. Aluminum Surfacing Notes. Edward Engle. *Light Metal Age*, v. 11, June 1953, p. 16-18.

Container, sequence, agitation, racking method, neutralizing, dye problem, temperature, cooling, refrigeration, and time. (L general, Al)

433-L. The Process of Vitreous Enamelling and the Equipment Needed. *Machinery Lloyd* (Overseas Ed.), v. 25, June 1953, p. 92-93, 95-96.

Production of frit and application of enamel. Recently developed plant. (L27)

434-L. Tanks for Electroplating and Pickling. Frank Spicer. *Mechanical World and Engineering Record*, v. 133, June 1953, p. 266-268.

Selection of tanks to contain electroplating, pickling, and allied alkali or acid solutions. Use of new and established materials. Diagrams. (L17, L12)

435-L. Protective Finishing of Aluminum for Aircraft. Durward Armstrong. *Metal Progress*, v. 63, June 1953, p. 104-108.

Chemical films and application by dip and spray methods. Photographs. (L16, L23, Al)

436-L. Relation Between Roughness of Interface and Adherence of Porcelain Enamel to Steel. J. C. Richmond, D. G. Moore, H. B. Kirkpatrick, and

W. N. Harrison. *National Advisory Committee for Aeronautics*, Washington, D. C., Technical Note 2934, Apr. 1953, 29 p.

Tests showed a correlation between roughness and adherence. Tables, graphs. (L27, CN)

437-L. "Araldite". A New Synthetic Resin for Surface Coating. *Organic Finishing*, v. 14, June 1953, p. 10-12, 17.

Preparation, pigmentation, properties, and uses of the resin. Tables. (L26, Al)

438-L. Metal Cleaning Equipment and Methods. II. John E. Hyler. *Organic Finishing*, v. 14, June 1953, p. 13-17.

Different methods to clean and dry metal equipment. Photographs. (L12)

439-L. Automotive Production Finishing. III. Rick Mansell. *Organic Finishing*, v. 14, June 1953, p. 19-21.

Wet sanding of primer-surfacer, insulating operations, the neutral sealer-coat, finishing room operations, and baking. Photographs. (L10, L26)

440-L. Solid Diffusion Gives a Nickel-Chromium Alloy Coating Over Low Carbon Steel. *Precision Metal Molding*, v. 11, July 1953, p. 56-57.

Technique and its advantages. (L15, Ni, Cr, CN)

441-L. Finishing Systems for Aluminum Die Castings. Russell V. Vanden Berg. *Precision Metal Molding*, v. 11, June 1953, p. 58-60, 63-65, 67, 88-91.

Polishing and buffing; barrel finishing; chemical treatments; electroplating; and anodic and organic coatings. (L general, Al)

442-L. Producing Decorated Drums. *Product Finishing*, v. 6, June 1953, p. 49-53.

"Rheecote" process for finishing American-type pails. Plant equipment. Photographs. (L26)

443-L. Finishes for Soft Soldering. Hot Tinning. E. E. Halls. *Product Finishing*, v. 6, June 1953, p. 59-66.

Applying a Sn or solder coating by hot dipping. Diagrams, tables. (L16, K7, Sn)

444-L. Hot Spray Limitations. E. Johnson. *Product Finishing*, v. 6, June 1953, p. 67-68, 102.

Points to be considered when employing hot spray techinques. Hints to operators of various types of equipment. (L26)

445-L. Coatings and Corrosion Research. *Product Finishing*, v. 6, June 1953, p. 74-76, 106.

Recent investigations by the British Iron and Steel Research Assoc. Includes pickling and acid recovery; heat treatment protection; electrochemistry of coatings; hot dipping process; coating metallurgy; and corrosion studies. (L general, J general, R general)

446-L. Hot Spray Finishing of Machine Tools. Roy W. Hill. *Products Finishing*, v. 17, July 1953, p. 22-28, 30, 32.

Applying machine tool lacquer or enamel to cast iron, steel, and Al parts. Photographs. (L26, Al, CI, ST)

447-L. New Sheet and Tin Plate Facilities for the West. *Western Machinery and Steel World*, v. 44, June 1953, p. 92-94.

Equipment described and illustrated. (L16, F23, Sn, CN)

448-L. Materials of Maximum Creep and Oxidation Resistance Produced by Coating Tungsten and Molybdenum With Vapor Deposited Silicon. E. Fitzer. Henry Brutcher Translation 2956, 27 pages.

Previously abstracted from *Berg- und Hüttenmännische Monatshefte*. See item 651-L. 1952. (L15, H general, Mo, Si, W, SG-h)

449-L. (German.) Anodic and Chemical Polishing as Preparation for Electrodeposition. B. Wullhorst. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. A28-A32.

Polishing which removes macroscopic roughness, yields surfaces of high reflective potential, and supplements mechanical methods. (L17, L12, L13)

450-L. (German.) Lustrous Electrolytic Metallic Deposits. E. Raub. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. p. B17-B25.

Formation of bright plates of vraious metals. (L17, Ag, Ni, Cu, Zn)

451-L. (German.) Active Carbon in Electroplating. B. Wullhorst. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. B25-B29.

Carbon treatment of Ni baths in which low molecular substances are not absorbed and from which sulfonic acids can be separated. (L17, Ni)

452-L. (German.) Investigations on the Preece Test. H. Bablik, F. Götzl, and E. Nell. *Metalloberfläche*, v. 7, no. 5, May 1953, p. A66-A72.

Unreliability of Preece test due to varying potentials of Zn deposits, varying Fe-Zn phases, oxide films, etc. Tables, micrographs, graphs, diagrams. (L17, Zn, Fe)

453-L. (German.) Alloy Formation by Diffusion in the Case of Electrolytically Deposited Metals. G. Wörwag. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. B29-B32.

Influence of time and temperature on diffusion. Methods of hindering and achieving diffusion. (L17, N1, Zn, Cu, Fe, Au, Ag)

454-L. (German.) Density and Direction of Flow Patterns in Electrolytic Baths. J. Steiner and M. Ruiner. *Metalloberfläche*, v. 7, no. 5, May 1953, p. B69-B72.

How current flow lines can be controlled by arrangement, form, and size of electrodes. Diagrams. 9 ref. (L17)

455-L. (German.) Substitute Coatings to Relieve the Scarcity of Nickel. Heinz W. Dettner. *Metalloberfläche*, v. 7, no. 5, May 1953, p. B72-B74.

Results of plating with white brass, red bronze, Sn-Zn, and Sn-Ni. 9 ref. (L17, Ni, Cu, Sn)

456-L. (German.) Silicone Containing Metal-Polishing Pastes. W. Burkart and L. Gerl. *Metalloberfläche*, v. 7, no. 5, May 1953, p. B74-B76.

Silicone oils can improve quality and economy in metal polishing. Lowering of polishing temperature is beneficial to surfaces to be electroplated. Tables. 13 ref. (L10, L17, Al, Cr, Ni)

457-L. (German.) Coloring Cast Zinc. Hans Reininger. *Metalloberfläche*, v. 7, no. 5, May 1953, p. B76-B77.

French patent on method of dyeing cast zinc alloys. Tables. (L26, Zn)

458-L. Electropolishing. A. T. Steer, J. K. Wilson, and O. Wright. *Aircraft Production*, v. 15, July 1953, p. 242-249.

Influence on the fatigue-endurance limit of ferrous and nonferrous parts. (L13, Q7, CN, Ni)

459-L. A Study of Fishscaling Produced by Induction of Hydrogen Into Enameled Iron. E. E. Bryant, B. J. Sweo, G. E. Miller, and M. L. Simmons. *American Ceramic Society Bulletin*, v. 32, July 1953, p. 248-252.

Tests to determine fishscaling tendencies. Tables, photographs, graphs. 5 ref. (L27, ST, CI)

460-L. How to Prevent Ink Roller Stripping. *American Pressman*, v. 63, July 1953, p. 25-26.

New method of Cu-plating steel rollers to prevent roller stripping. (L17, Cu, ST)

461-L. Blistering of Enamels Due to Gas Evolution From Cast Iron. E. R. Evans. *British Cast Iron Research Association*, v. 4, June 1953, p. 586-589.

Blistering and factors affecting the formation of iron oxide and its reaction with graphite. 4 ref. (L27, R2, CI)

462-L. Pickling Equipment for Hand Galvanising. H. Rückemesser. *Draht* (English Ed.) June 1953, p. 50-52.

Auxiliary equipment which is indispensable for satisfactory pickling. Diagrams, photographs. (L12, Zn, CN)

463-L. Stainless Steel Spraying of Drums and Shafts in the Chemical and Food Industries. *Electroplating and Metal Spraying*, v. 6, July 1953, p. 267, 271.

Use of heavy coatings of stainless steel to withstand corrosive and abrasive conditions. Photographs. (L23, SS)

464-L. The Influence of Fuel Gas on the Spraying of Metal Powders. William McDermott and Robert Dickinson. *Engineer*, v. 196, July 3, 1953, p. 6-9.

Use of acetylene, methane, propane, butane; natural, coal, and enriched coal gas; and enriched propane for metal spraying. Chemical reactions in the flames and a hypothesis to explain why gases with widely different physical properties produce similar results. Tables. (L23)

465-L. Gas in the Lead Sheathing of Electricity Cables. *Gas Journal*, v. 275, July 8, 1953, p. 97-98.

Use of gas to melt Pb in the coating process. Tables, photographs. (L24, Pb)

466-L. Painting the New Republic Steel Kitchen Cabinets. Walter Rudolph. *Industrial Finishing*, v. 29, July 1953, p. 38-40, 42.

Preparation and finishing processes. Photographs. (L26, CN)

467-L. How to Prepare Aluminum for Painting. A. T. Thibadeau. *Industrial Finishing*, v. 29, July 1953, p. 60, 62, 67-68.

Cleaning processes and equipment. Photographs. (L26, L12, Al)

468-L. Mechanize Finishing to Cut Costs. Paul J. Straight. *Iron Age*, v. 172, July 16, 1953, p. 136-139.

Steel parts are chemically cleaned and phosphated before painting to inhibit rust and get better adhesion. Photographs. (L12, L14, ST)

469-L. Ultrasonics. The Answer to Aluminum Soldering? Leo Walter. *Materials & Methods*, v. 38, July 1953, p. 59-61.

Ultrasonic vibrations rapidly remove tough oxide film from Al surfaces. Improved tinning and better joint properties result. (L10, K7, Al)

470-L. Surface Contamination and Quality in Titanium Fabrication. V. C. Petersen. *Materials & Methods*, v. 38, July 1953, p. 72-73.

Procedures to minimize contamination resulting from cleaning and forming operations. Micrographs. (L10, L12, F general, Ti)

471-L. The Future of General Galvanizing. R. Lewis Stubbs and A. B. L. Chivers. *Metal Industry*, v. 82, June 26, 1953, p. 527-528.

Analysis of trends in the industry since 1945, possible competitive methods for protecting steel, and fields in which galvanizing could be more widely used. Tables. (L16, Zn, Al, CN)

472-L. For Electrical Uses: Silver Plated Aluminum Conductors. T. J. Connor and W. R. Wilson. *Modern Metals*, v. 9, July 1953, p. 50-54, 56.

Tests to determine advantages of the process. Photographs, diagrams. (L17, P15, Al, Ag)

473-L. A Flexible Plated Circuit. E. R. Bowerman and R. F. Walton. *Plating*, v. 40, July 1953, p. 765-766.
Materials and process for a cloth-backed plated circuit. Diagram, photographs. (L17, Cu, SS)

474-L. Nickel Plating of Aluminum Propeller Blades. *Plating*, v. 40, July 1953, p. 774-776.
Characteristics essential for plating, and the process. Photographs. (L17, Al, Ni)

475-L. Surface Treatment and Finishing of Light Metals. VIII. S. Wernick and R. Pinner. *Sheet Metal Industries*, v. 30, July 1953, p. 571-583.
Electrolytic and chemical polishing processes and industrial applications. Graphs, tables. 50 ref. (L12, L13, Al, Mg)

476-L. Factors Influencing the Selection of Metal Finishes. A. W. Wallbank. *Sheet Metal Industries*, v. 30, July 1953, p. 585-588, 590.
Purpose of finishes, fundamental factors, physical effects, service performance, appearance, and cost. (L general)

477-L. What to Plate. Allen G. Gray. *Steel*, v. 133, July 20, 1953, p. 84-88, 96.
Shows that available Ni is being stretched by substituting finishes such as Cu-Cr, Zn, and white brass to keep bright work on metal products. Tables, photographs. (L17, Ni, Cu, Cr, Zn)

478-L. British Streamline Tin Plate Lines. *Steel*, v. 133, July 27, 1953, p. 84, 86, 104.
Pickling, degreasing, annealing, temper rolling, and electrotinning. Photographs. (L17, L12, J23, F23, CN, Sn)

479-L. Tank Castings Get Shot Blasted. Erle F. Ross. *Steel*, v. 133, July 27, 1953, p. 106-107.
Shot blast equipment for big one-piece cast steel hulls for "Patton" tanks. Photographs. (L10, CI)

480-L. Ion-Free Water Makes Cents in Metal Finishing. Anthony Gigliotti. *Steel*, v. 133, July 13, 1953, p. 124.
Economies include reduction in amount of cleaning compound needed, elimination of hard-water precipitates, and fewer cases of under-film corrosion in enameling operations. (L12, L27)

481-L. Stellite in the Forging Industry. M. Riddihough and S. Grainger. *Welding and Metal Fabrication*, v. 21, July 1953, p. 242-244.
Depositing "Stellite" Alloy "C" and "6" to tools to prolong life. Photographs. (L24, Co, Ni)

482-L. Mollerizing Process Offers Anti-Rust Aluminum Coating. *Western Metals*, v. 11, July 1953, p. 44-46.
Process in which steel is coated with Al to prevent oxidation, peeling, and corrosion. Photographs. (L15, R general, Al, ST)

483-L. High Temperature Ceramic Coating for Jet Engines Replaces Critical Alloys. John V. Long. *Western Metals*, v. 11, July 1953, p. 54-56.
Development of coating used for stainless steels, low-alloy materials, and mild steels. Photographs. (L27, SS, CN)

484-L. (English, Spanish.) **Painting Methods for Modern Machinery.** *Machinery Lloyd (Overseas Ed.)*, v. 25, July 4, 1953, p. 107-109.
Preparation for and application of paint on machinery. (L26, Al, Zn, ST, CI)

485-L. Inhibitors vs. Accelerators. The Theory and Use of Acid Inhibitors and Accelerators. W. Billingsley. **Acid Pickling and Depolarizers.** J. T. Irwin. **Inhibitors and Adjuncts.** Alfred Douty. *Wire and Wire Products*, v. 28, July 1953, p. 679-681, 717-718.
Action and merits of additions to pickling baths. (L12, CN)

486-L. (Dutch.) **Abrasives for Polishing Machines.** *Metalen*, v. 8, no. 5, Mar. 14, 1953, p. 120-121.
Various types of U. S. and European abrasives, especially "Cyldac" (cutwire). Advantages. Photographs. (L10, G19)

487-L. (Dutch.) **The Cleaning of Iron and Steel Before Applying an Organic Coating.** A. Groenendijk. *Metalen*, v. 8, no. 8, Apr. 30, 1953, p. 2-8.
Various methods and agents, especially the effect of phosphoric acid. Practical advantages of well-composed rinsing baths and applications. Photographs. (L10, L26, CI, ST)

488-L. (Dutch.) **Combatting Corrosion by Means of Thermohardening Lacquers.** W. L. Essed. *Plastica*, v. 5, no. 12, Dec. 1952, p. 368-373.
Various lacquers baked onto metal parts to reduce corrosion. Photographs, graphs. (L26, R general)

489-L. (French.) **Protective Chemical Treatment of Tin.** E. S. Hedges. *Metaux Corrosion-Industries*, v. 28, no. 332, Apr. 1953, p. 171-174.
Improvement of the "Protectetain" method. Photographs. (L14, Sn)

490-L. (French.) **Comparative Fields of Application for Electrolytic White Iron and Quenched White Iron** W. R. Lewis. *Metaux Corrosion-Industries*, v. 28, no. 332, Apr. 1953, p. 175-183.
Data, prices and advantages of electrolytic tinning on basis of American processing. Diagrams, photographs. (L17, Sn)

491-L. (Book.) **American Electroplaters' Society, Proceedings, (Annual Volume)**, v. 39, 1952. 272 p. American Electroplaters' Society, 445 Broad St., Newark, N. J.
Consists of papers abstracted separately, on various aspects of plating. (L17)

492-L. (Book.) **Handbook of Barrel Polishing.** 34 pp. 1953. R. Cruickshank Ltd., Camden Street, Birmingham 1, England. 10s.
Types of barrels and their uses in finishing. (L10)

493-L. (Book.) **Metal Cleaning Bibliographical Abstracts. New Ed.** Jay C. Harris, compiler. 132 p. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $4.25.
Material is presented in order to make published data on metal cleaning readily available to persons concerned with production, finishing, and maintenance of metal products. Several hundred new references bring the work up to date on all kinds of metal and most types of processes. (L10, L12, L13)

494-L. (Book.) **Painting Practice for Aluminum.** 19 p. Aluminum Development Assoc., 33 Grosvenor St., London, W.1, England.
Cleaning, degreasing, pretreatment, and paint finishes for Al. (L12, L26, Al)

495-L. (Book.) **Radiation Suppressing Coatings for Metals at Elevated Temperatures.** A. H. Sully, E. A. Brandes, and R. B. Waterhouse. 24 p. 1953. Fulmer Research Institute, Ltd., Stoke Poges, Buckinghamshire, England.
Describes tests determining the best coatings suited to reduce temperatures of metals. (L general, Ni, SS, CN)

496-L. (Book—German.) **(Chromium Plating Handbook.) Handbuch der Elektrolytischen Verchromung. Ed. 3.** Robert Bilfinger. 331 p. 1952. Fachbuchverlag Siegfried Schütz, Hanover, Germany. 23 DM.
Revised edition is enlarged to include sections on theory and decorative plating. Original title was "Hart Verchromungs Verfahren", (Hard Chromium Plating Procedure). (L17)

Metallography, Constitution and Primary Structures

232-M. Techniques for the Electron Microscopy of Crystals. I. M. Dawson. *British Journal of Applied Physics*, v. 4, June 1953, p. 177-181.
New electron microscopy techniques and modifications of existing techniques are discussed with reference to the examination of crystals. Methods of preparing crystals, replica techniques, and shadow-casting. 20 ref. (M21)

233-M. The Use of Diamond Abrasives for a Universal System of Metallographic Polishing. L. E. Samuels. *Institute of Metals, Journal*, v. 81, June 1953, p. 471-478.
Investigations to determine most efficient and economical methods. Photographs. 26 ref. (M21, Bi, Sn, Cd, Pb, Zn, Mg, Al, Ag, Cu, ST, Ni, Ti)

234-M. The Solubility of Indium in Copper. E. A. Owen and E. A. O'Donnell Roberts. *Institute of Metals, Journal*, v. 81, June 1953, p. 479-480.
The α-phase boundary of the Cu-In system from 710 to 470° C. is recorded. Tables, graphs. 4 ref. (M24, Cu, In)

235-M. Macroscopic Spirals and the Dislocation Theory of Crystal Growth. N. Cabrera. *Journal of Chemical Physics*, v. 21, June 1953, p. 1111-1112.
Stabilization of the macroscopic step forming the spiral. 5 ref. (M28, M26)

236-M. Microscopical Examination of Tin Bronzes in the Alpha Range. E. C. W. Perryman. *Journal of Metals*, v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 906-910.
On electropolishing, high-purity Cu-Sn and Cu-Sn-P alloys with more than 5 to 9% Sn were found to contain many grain boundaries with a ridge-and-furrow profile, due to enrichment of certain boundaries in tin, or possibly by an impurity present in the tin as a solid solution. Micrographs. 12 ref. (M21, M27, Cu, Sn)

237-M. Grain Boundary Attack on Aluminum in Hydrochloric Acid and Sodium Hydroxide. E. C. W. Perryman. *Journal of Metals*, v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 911-917.
Investigation for high-purity Al-Fe alloys with up to 0.055% Fe as a function of Fe content and heat treatment. Results can be explained on the assumption that Fe segregates to the grain boundary in solid solution. Micrographs, tables. 17 ref. (M27, Al)

238-M. A Precision Back-Reflexion Microbeam X-Ray Camera With Provision for Pre-Selecting the Irradiated Area. R. W. Cahn. *Journal of Scientific Instruments*, v. 30, June 1953, p. 201-204.
A camera which allows the orientations of pre-selected individual grains in an aggregate to be accurately determined. A pinhole in a metal foil mounted next to the specimen is used as a reference point, through which the X-ray beam is sent by taking readings from an electronic counter placed behind the foil. Principles of X-ray collimation. (M22)

239-M. Metallography of Hafnium. H. P. Roth. *Metal Progress,* v. 63, June 1953, p. 84-89.

Samples for investigation and experimental procedure. As received, cold swaged, and annealed samples were examined. Micrographs. 17 ref. (M general, Hf)

240-M. Rational Phase Nomenclature. *Metal Progress,* v. 63, June 1953, p. 136, 138, 140, 142, 144.

Work by subcommittee 3, ASTM Committee on Metallography for standardizing terms used in phase studies. (M24, S22)

241-M. Difference Between the Density Distribution of Neutrons and Protons in Atomic Nuclei. P. Gombas. *Nature,* v. 171, May 30, 1953, p. 979-980.

Method of calculation. (M25)

242-M. The Small Angle Scattering of X-Rays From Cold-Worked Solids. D. L. Dexter. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1007-1012.

Computations on scattering expected from clustered cavities and from dislocations. 11 ref. (M26, Pb)

243-M. A Neutron Diffraction Study of Magnesium Ferrite. L. M. Gorliss, J. M. Hastings, and F. G. Brockman. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1013-1018.

Experimental and computation methods and an analysis of diffraction patterns. Graphs. 14 ref. (M22, Mg, Te, Mn, Zn)

244-M. Nuclear Hyperfine Structure of Mn. Mendel Sachs. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1058-1060.

Theoretical calculation of nuclear hyperfine splitting in Mn^{++}. 8 ref. (M25, Mn)

245-M. Dislocation Nodes in Face-Centered Cubic Lattices. N. Thompson. *Physical Society, Proceedings,* v. 66, sec. B, June 1953, p. 481-492.

Imposition of requirements of crystal geometry on the arrangement of partial dislocations at a node. Graphs. 5 ref. (M26)

246-M. (English.) **On the System Manganese-Tellurium.** S. Furberg. *Acta Chemica Scandinavica,* v. 7, no. 4, 1953, p. 693-694.

Relationships within the system of Mn and Te alloys. 7 ref. (M24, Mn, Te, Ti, Ni)

247-M. (German.) **Phase Diagram for Iron-Iron Sulfide-Cobalt Sulfide-Cobalt.** Rudolf Vogel and Gerhardt Friedrich Hillner. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 133-141.

Continuation of eutectic changes by peripheral systems in ternary region. Displacement of homogeneity range of CoS toward S was determined microscopically for Co-CoS system. Photographs, graphs, diagrams. 14 ref. (M24, Fe, Co)

248-M. (German.) **Electrodeposited Alloys.** E. Raub. *Metalloberfläche,* v. 7, no. 2, Feb. 1953, p. A17-A27.

Structure and mechanical properties of electrodeposited alloy crystals. Deviations from cast alloys are caused by lattice distortions. Graphs. (M26, L17, Q general, Cu, Zn, Cd, Ni)

249-M. Modification of High-Silicon Aluminium Alloys and the Corresponding Structures. Claude Mascré. *Foundry Trade Journal,* v. 94, June 25, 1953, p. 725-730.

Action of P and Na on hypereutectic Al-Si alloys. Diagrams, graphs, micrographs. 6 ref. (M27, Al)

250-M. The Structure of Titanium-Tin Alloys in the Range 0-25 At. % Tin. H. W. Worner. *Institute of Metals, Journal,* v. 81, July 1953, p. 521-528.

Experiments on two groups of alloys. Tables. 6 ref. (M27, Ti, Sn)

251-M. Titanium-Uranium System in the Region 0 to 30 Atomic Percent of Titanium. R. W. Buzzard, R. B. Liss, and D. P. Fickle. *National Bureau of Standards, Journal of Research,* v. 50, Apr. 1953, p. 209-214.

Tentative Ti-U phase diagram is amplified by thermal, microscopic, and X-ray analyses of alloys from 0 to 30 atomic % of Ti. Micrographs. (M24, M21, Ti, U)

252-M. A New Method of Making Electron Microscope Specimen Support Films. D. E. Bradley *Nature,* v. 171, June 13, 1953, p. 1076-1077.

Forming thin film suitable for specimen mounting. Photographs. (M21)

253-M. Structure of Magnesium-Lithium β-Phase Alloys. R. L. P. Berry and G. B. Raynor. *Nature,* v. 171, June 13, 1953, p. 1078-1079. (M26, Mg, Li)

254-M. Examination of Surfaces by X-Ray Reflection. R. H. Buteux. *Optical Society of America, Journal,* v. 43, July 1953, p. 618.

Examples. Photomicrographs. (M22, Au, Ag, Sn, Cu, Al, Mg, Sb, Te)

255-M. Nuclear Levels in Cs^{131}. J. M. Cork, J. M. LeBlanc, W. H. Nester, and M. K. Brice. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 76-77.

Results of radiation from Ba^{131}. 8 ref. (M25, Cs, Ba)

256-M. (English.) **The Crystal Structures of CeB_6, ThB_4, and UB_4.** Allan Zalkin and D. H. Templeton. *Acta Crystallographica,* v. 6, Mar. 1953, p. 269-272.

Metal locations are determined by X-rays and the boron locations by geometrical considerations. Method for making absorption corrections for highly absorbing crystals of prismatic form. Diagrams, tables. (M26, Ce, Th, U, B)

257-M. (English.) **The Structure of $MnAl_6$.** A. D. I. Nicol. *Acta Crystallographica,* v. 6, Mar. 1953, p. 285-293.

Experimental methods used and accuracy obtained in the structure analysis. Mn-Al and Al-Al interatomic distances are discussed in detail. Tables, diagrams. 24 ref. (M26, M25, Mn, Al)

258-M. (English.) **The Interpretation of X-Ray Powder Photographs of Crystals of Low Symmetry.** J. Thewlis and T. S. Hutchison. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 357-358.

Method, determination of unit cell, and application of method to alpha-U. (M22, U)

259-M. (English.) **X-Ray Evidence for the Interstitial Position of Carbon in Alpha Iron.** G. K. Williamson and R. E. Smallman. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 361-362.

Structure analysis. (M26, Fe)

260-M. (English.) **Influence of Mosaicity on the Bragg Reflexion of Polarized X-Rays.** S. Ramaseshan and G. N. Ramachandran. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 364-365.

Theoretical analysis. (M22)

261-M. (English.) **The Antiferromagnetic Structure Deformations in CoO and MnTe.** Selma Greenwald. *Acta Crystallographica,* v. 6, pt. 5, May 1953, p. 396-398.

CoO and MnTe were studied above and below their antiferromagnetic Curie temperatures with a symmetrical back-reflection camera. Graphs. (M26, Mn, Te)

262-M. (English.) **Crystal Structure and Antiferromagnetism of CrSb.** B. T. M. Willis, *Acta Crystallographica,* v. 6, pt. 5, May 1953, p. 425-426.

Experimental investigation. (M26, P16, Cr, Sb)

263-M. (English.) **Optimum Geometric Conditions in the Design and Use of X-Ray Diffraction Tubes and Cameras.** H. E. Huxley. *Acta Crystallographica,* v. 6, June 1953, p. 457-465.

Theory is developed which enables optimum geometric conditions to be determined under various conditions. Validity of simplifying assumptions. Implications of the analysis. It is concluded that a need exists for X-ray tubes of variable focal size. Tables. (M22)

264-M. (English.) **A Method for the Estimation of Transmission Factors in Crystals of Uniform Cross Section.** N. Joel, R. Vera, and I. Garaycochea. *Acta Crystallographica,* v. 6, June 1953, p. 465-468.

Method and examples of application. Expected accuracy. Diagrams, tables. (M26)

265-M. (English.) **A Three-Dimensional Coordinate Model for Demonstration of Inorganic Crystal Structures.** A. J. E. Welch. *Acta Crystallographica,* v. 6, June 1953, p. 476-477.

A transparent plastic framework in which colored pins may be inserted to show the arrangements of atoms in simple unit cells. (M26)

266-M. (English.) **The Interpretation of Diffuse X-Ray Reflexions From Single Crystals. II.** J. Hoerni and W. A. Wooster. *Acta Crystallographica,* v. 6, June 1953, p. 543-547.

Factors affecting the intensity of X-ray reflections from single crystals. Divergence corrections which make allowance for the fact that the beam is not infinitely narrow and the crystal is not ideally perfect. Diagrams. (M26)

267-M. Optical Microscopy. George L. Kehl. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 1-32.

Phase contrast microscopy, the reflecting-type objective, and their application to metallurgy. The reflection technique permits extensive working distances. Any reasonable wave length of radiation may be used (3500Å to 26000Å). (M21)

268-M. Field Emission Microscopy. Erwin W. Müller. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland. p. 33-50.

"Microscope" which is a specialized cathode-ray tube. Device is capable of 500,000 X on films on the order of 2Å thick. Problems of the instrument. (M21)

269-M. Electron Diffraction and Microscopy of Metals. R. D. Heidenreich. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 51-71.

Several cases where the above revealed new facts on the metals studied. Emphasizes careful sample preparation. Alnico V is described. (M22, M21, SG-n)

270-M. X-Ray Diffraction Techniques. Charles S. Barrett. "Modern Research Techniques in Physical Metallurgy." American Society of Metals, Cleveland, p. 72-94.

Limited to production and measurement of X-rays. Reviews modern X-ray tubes, monochromators, and counting tubes for intensity measurement. (M22)

271-M. The Diffuse Scattering of X-Rays. B. E. Warren and B. L. Averbach. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 95-130.

Diffuse pattern shows the level of disorder in a crystal in contrast to the sharp Bragg reflections. Resolution of four other sources of diffusion and mathematics of analysis. (M22)

272-M. Crystal Orientation and Pole Figure Determination. A. H. Geisler. "Modern Research Techniques in Physical Metallurgy". American Society for Metals, Cleveland, p. 131-153.

Older "cut-and-try" methods. Diagrams of principles involved. Describes such recent tools as the integrating pole figure goniometer and automatic pole figure recorder. (M23)

273-M. Techniques and Applications of Neutron Diffraction. C. G. Shull. "Modern Research Techniques in Physical Metallurgy". American Society for Metals, Cleveland, p. 154-169.

Compared with present X-ray techniques, recent studies, and applications. (M22)

274-M. (French.) Regarding Some Quantities Depending on the Crystalline Symmetry of Metals. G. Bonfiglioli, A. Ferro, and G. Montalenti. *Journal de Chemie Physique et de Physico-Chimie Biologique,* v. 50, no. 1, Jan. 1953, p. 22-25.

Theoretical study. Tables. (M26)

275-M. (Russian.) Structural Diagrams of Metallic Systems on a Chromium Base. I. I. Kornilov and V. S. Mikheev. *Uspekhi Khimii,* v. 22, no. 1, Jan. 1953, p. 87-98.

Alloys of Cr with various elements and typical phase diagrams for each group. Study made in connection with production of new type Cr alloys. Tables, figures. 36 ref. (M24, Cr)

276-M. (Book.) The Intelligent Use of the Microscope. Ed. 2. C. W. Oliver. 192 p. 1953. Chemical Publishing Co., 212 Fifth Ave., New York 10, N. Y.

Optical theory; components and accessories of the microscope; selecting the right equipment; illumination; filters; and special instruments and applications. (M21)

277-M. (Book.) Modern Research Techniques in Physical Metallurgy. 335 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio. $5.00.

A seminar of 14 papers presented at the 34th National Metal Congress and Exposition in Philadelphia on Oct. 18 to 24, 1952, sponsored by ASM. Papers abstracted separately. (M general, N general)

278-M. (Book—German.) (Handbook of Ore Microscopy.) Erzmikroskopisches Praktikum. Hans Schneiderhöhn. 274 p. 1952. E. Schweizerbart'sche Verlagsbuchhandlung (Erwin Nägele), Stuttgart, Germany.

Includes chapters on optical examination methods; chemical reactions on polished surfaces; and microchemical, spectrographic, and X-ray determination of ore minerals. (M21)

N

Transformations and Resulting Structures

182-N. Experiments on Spherulite Formation in Cast Iron. Jack Keverian, Howard F. Taylor and John Wulff. *American Foundryman,* v. 23, June 1953, p. 85-91.

Experiments to determine whether absence rather than presence of certain components causes spherulite formation. Micrographs. 25 ref. (N12, E25, CI)

183-N. X-Ray Broadening From Precipitation in Cu-Fe Alloys. T. S. Hutchison. *Journal of Applied Physics,* v. 24, June 1953, p. 813-814.

Results of heat and mechanical treatments on the physical properties of Cu-Fe alloys were studied by X-ray diffraction photographs. Graphs. 9 ref.
(N7, M22, Q general, Cu, Fe)

184-N. A Statistical Theory of Order-Disorder Equilibrium at High Temperatures. Philip Schwed and Gerhart Groetzinger. *Journal of Chemical Physics,* v. 21, June 1953, p. 963-964.

An expression for the free energy of a binary cubic alloy undergoing order-disorder transition, derived by direct evaluation of the configurational partition function. 5 ref.
(N10, P12)

185-N. The Correlation of Solid Metal and Nonelectrolyte Solubilities. Peter L. Auer. *Journal of Chemical Physics,* v. 21, June 1953, p. 1113-1114.

Compares Hildebrand's and Kleppa's methods. (N12)

186-N. Martensite Nucleation in Substitutional Iron Alloys. John C. Fisher. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 918-920.

Nucleation theory is applied to martensite nucleation in substitutional Fe alloys. Composition fluctuations are neglected, and a steady rate of nucleation is predicted for any composition and temperature. Maximum rate of nucleation is shown to be measurable only for an extremely narrow composition range, being too great or too small outside this range. Graphs. 10 ref.
(N2, Fe, Ni)

187-N. Effect of Nickel and Molybdenum on Stabilization of the Austenite-Martensite Transformation. D. J. Blickwede. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 922-923.

Investigation to provide information about the effect of two common elements on stabilization in hyper- and hypo-eutectoid steels.
(N8, Ni, Mo)

188-N. Preferred Precipitations in Some Age-Hardened Aluminium Alloys. Hideo Nishimura and Yotaro Murakami. *Memoirs of the Faculty of Engineering, Kyoto University,* v. 15, Jan. 1953, p. 9-26.

Results for a submicroscopic investigation using an electron microscope. Micrographs. (N7, M21, Al)

189-N. Solute Distribution in Germanium Crystals. W. P. Slichter and E. D. Kolb. *Physical Review,* v. 90, June 1, 1953, p. 987-988.

Growth of Ge crystals from the melt. (N12, Ge)

190-N. Calculation of Martensite Nucleus Energy Using the Reaction-Path Model. J. C. Fisher and D. Turnbull. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 921-922.

Calculations. 7 ref. (N9)

191-N. On the Decomposition of Retained Austenite in Steel When Being Shot Peened. N. A. Karasev. Henry Brutcher Translation 2957, 4 pages. (From *Vestnik Mashinostroeniya,* v. 32, 1952, no. 1, p. 44-46.)

Results of microscopic analysis of steels before and after shot peening. Photographs, graphs. 4 ref.
(N8, M27, G23, ST)

192-N. Influence of Grain Size Upon Diffusion of Nitrogen. A. G. Andreeva, I. E. Kontorovich, and A. A. Sovalova. Henry Brutcher Translation 3010, 10 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 17, 1947, no. 12, p. 1521-1526.)

An experimental study of the effect of different grain sizes upon depth of diffusion of N into "Armco" Fe. Table, graphs. 6 ref.
(N1, M27, Fe)

193-N. Investigation of Diffusion of Chromium in Iron-Chromium Alloys Containing Third Elements. S. Gertsriken and I. Dekhtyar. Henry Brutcher Translation 3013, 20 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 20, 1950, no. 8, p. 1005-1014.)

The process of diffusion of Cr in Fe-Cr alloys with additions of Ni, Be, Ti, W, Si, Sn, and Cb, which differ from one another in valency and atomic radius. Tables, graphs. 10 ref.
(N1, Fe, Cr, Ni, Be, Ti, W, Si, Sn, Cb)

194-N. Influence of Alloying Elements Upon Martensite Transformation Temperatures. I. V. G. Vorob'ev and A. P. Gulyaev. Henry Brutcher Translation 3020, 10 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 21, 1951, no. 10, p. 1157-1163.)

Importance of a knowledge of the initial and final temperatures for the industrial cold treating of steel. Table, graphs. 18 ref.
(N8, J2, AY)

195-N. On The Initial Stages of Fusion of Complex Metallic Systems. N. T. Gudtsov and M. G. Lozinskii. Henry Brutcher Translation 3043, 8 pages. (From *Doklady Akademii Nauk SSSR,* v. 73, 1950, no. 4, p. 689-692.)

Experiments involving the heating of complex alloys and studying structural changes during the heating process. Diagram, photographs. 6 ref.
(N6, AY, Mo, Cr, Cb, Mn, Si)

196-N. (German.) Formation and Properties of Delta Iron (Ferrite) and Sigma Phase in Austenitic Chromium-Nickel Steels. Herbert Buchholtz, Hanz Krächter and Franz Kraemer. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 113-125.

18% Cr steels and 9% Ni steels do not lend themselves to ferritic separation under ordinary treatment. Delta- to sigma-phase conversion was achieved in high-temperature quenched alloys by tempering. Photographs, graphs, tables. 14 ref.
(N8, P general, Q general, SS)

197-N. (German.) Formation of Nuclei During Conversions in Irreversible Iron-Nickel Alloys. Georg Masing and Otto Nickel. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 143-151.

Results of thermodynamic computations and tests. It is possible for compositions of phases observed in delayed-conversion processes to deviate from equilibrium diagram. Graphs, diagrams, tables. 30 ref.
(N2, P12, M24, Fe, Ni)

198-N. (German.) Irreversibility of Iron-Nickel Alloys. Erich Scheil. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 153-160.

Difficulties of determining $\alpha + \gamma$ equilibria because of athermal conversion. Conversions can be hindered by mechanical stresses and may be linked with compositional changes. Photographs, graphs. 48 ref. (N6, Fe, Ni)

199-N. (German.) Signs of Aging in Unalloyed, Soft Cast Steels. Werner Hesse. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 173-181.

Rockwell hardness measurements on openhearth and bessemer steels. Graphs. 23 ref. (N7, Q29, CI)

200-N. Some Effects of Nitrogen in Cast Iron. J. V. Dawson, L. W. L. Smith, and B. B. Bach. *British Cast Iron Research Association,* v. 4, June 1953, p. 540-552.

Influence of N on graphitization and mechanical properties.
(N8, Q general, CI)

201-N. The Application of Grain Refinement to Cast Copper-Alumini-

um Alloys Containing the Beta Phase. J. P. Dennison and E. V. Tull. *Institute of Metals, Journal,* v. 81, July 1953, p. 513-520.

Additions of boron were used to produce nucleation. Laboratory results were confirmed on commercial scale. Mechanical properties were improved. Tables. 35 ref. (N2, Q general, Cu, Al)

202-N. Epitaxial Deposits of Metals Evaporated on Salt Substrates. Olive G. Engel. *National Bureau of Standards, Journal of Research,* v. 50, May 1953, p. 249-261.

Experimental data and theoretical considerations relating to the process of oriented overgrowth of crystals. Case of epitaxy resulting from vapor phase deposition of metals on rock salt. Au and Ag were used. Micrographs, diagrams, tables. 40 ref. (N15, Au, Ag)

203-N. Crystal Growth and Crystal Boundary Techniques. Bruce Chalmers. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 170-185.

The method of making a metal crystal depends on what the specimen is to show. Methods include vapor phase formation, growth from solution, solidification, and growth in the solid state. (N12, N15)

204-N. (English.) The Crystallography of the Titanium Transformation. Carl J. McHargue. *Acta Crystallographica,* v. 6, June 1953, p. 529-530.

Experimental procedure. (N6, Ti)

205-N. (French.) Present State of the Metallography of Alloyed Austenites, Particularly in 18-8 Steels. II. Reactions by Diffusion in Austenites With a High Content of Alloy Elements. Paul Bastien and Jacques Dedieu. *Métaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 95-101.

Compares diffusion in interstitial and substitutional alloys. Effects of temperature, composition, and cold work. Tables, graphs. 14 ref. (N1, N8, SS)

206-N. (Italian.) Separation of Graphite in Nodular Iron. Carlo Longaretti and Roberto Sacerdote. *Metallurgia Italiana,* v. 45, no. 3, Mar. 1953, p. 94-99.

Cooling curves were determined for nodular iron before and after treatment with Mg and "FeSi 75". Diagrams, photographs. 14 ref. (N8, CI)

207-N. (Russian.) Phase and Structural Transformations in Steel During Repeated Recrystallization. D. S. Kazarnovskii. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 3, Nov. 21, 1952, p. 409-413.

Effect of grain boundaries and degree of dispersion of carbides in the initial structure and the grain size and mechanical properties after recrystallization. Carbon steels (0.47% C; 0.78% Mn; 0.25% Si) and (0.57-0.67% C; 0.68-0.83% Mn; 0.16-0.21% Si) and chromium steels (0.46% C; 0.72% Mn; 0.25% Si; 0.77% Cr) were studied. Tables, graphs, micrographs. 13 ref. (N5, M27, C, CN)

208-N. (Russian.) Existence of Metalloids Dissolved in Metal. O. A. Esin and P. V. Geld. *Uspekhi Khimii,* v. 22, no. 1, Jan. 1953, p. 62-86.

Shows the C, H, and probably N, existence in liquid Fe. Points out existence of Cr, Mn, Ni, and Co in form of positively charged particles. Figures, tables. 75 ref. (N12)

209-N. (Russian.) Carbide Formation in Alloyed Steels at High Annealing Temperatures. G. V. Kurdiumov and M. D. Perkas. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 1, Nov. 1, 1952, p. 41-43.

Effects of Ti, V, and Mo as alloying elements and of temperature. 7 ref. (N8, Ti, V, Mo)

210-N. (Book—French.) (The Solid State. Reports and Discussions.) L'Etat solide. Rapports et discussions. Solvay International Institute of Physics, 577 p. 1952. R. Stoops, Brussels, Belgium. 650 francs.

Consists of papers given at the Ninth Physics Council held at the Free University of Brussels, Sept. 25-29, 1951. Papers are concerned with work on grain boundaries, recrystallization, transformations, and dislocations. (N general)

P

Physical Properties and Test Methods

350-P. Theory of Magnetic Effects on the Noise in a Germanium Filament. Harry Suhl. *Bell System Technical Journal,* v. 32, May 1953, p. 647-664.

Quantitative theory of the magnetic effect. Graphs. (P16, Ge)

351-P. Transmission Properties of Laminated Clogston Type Conductors. E. F. Vaage. *Bell System Technical Journal,* v. 32, May 1953, p. 695-713.

Transmission properties are discussed by introducing the concepts of equivalent inductance, capacitance, and resistance values which are analogous to their corresponding counterparts in the treatment of ordinary transmission lines. From these constants the attenuation, phase constant, and speed of propagation are obtained using conventional transmission line theory. Results are compared with those for ordinary coaxial conductors. Diagrams. (P15, Cu)

352-P. On the Temperature Sensitivity of Special Magnetic Materials. T. A. Heddle. *British Journal of Applied Physics,* v. 4, June 1953, p. 161-166.

Magnetic materials which are sensitive to temperature from −60 to +120° C. Applications of these materials to temperature detecting and compensating devices. Graphs. 40 ref. (P16, T8, SG-n, p)

353-P. Kinetics of Silver-Silver Ion Exchange. A. Baerg and C. A. Winkler. *Canadian Journal of Chemistry,* v. 31, June 1953, p. 521-527.

Results of investigation made of the exchange kinetics on etched Ag surfaces. (P13, Ag)

354-P. Acoustic Wave Velocities, Elastic Constants, and Debye Characteristic Temperature for Polycrystalline MgCd. Charles S. Smith and W. E. Wallace. *Journal of Chemical Physics,* v. 21, June 1953, p. 1120.

8 references. (P17, Q21, Mg, Cd)

355-P. Electrical Resistance of Titanium Metal. James L. Wyatt. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 903-905.

Electrical resistance as a function of purity and temperature was measured from −325 to 2800° F. Two points of inflection in the data plots were found. An increase in resistance with increase in temperature above the transformation was observed. Tables. (P15, Ti)

356-P. "Color" and Reflectance of Stainless Steels. F. K. Bloom. *Metal Progress,* v. 63, June 1953, p. 67-72.

Physical measurements. How variations in composition affect reflectance properties; effects of different polishing methods. Diagrams, photographs. (P17, L10, SS)

357-P. A Theory of Ferromagnetism. Linus Pauling. *National Academy of Sciences of the United States of America, Proceedings,* v. 39, June 1953, p. 551-560.

Formulation of a theory that seems to provide a simple explanation of the phenomenon. 16 ref. (P16)

358-P. Gamma-Ray Output of Radium. A. Ghosh, J. Kastner, and G. N. Whyte. *Nucleonics,* v. 11, June 1953, p. 70-72.

Cavity-chamber measurements of Ra γ-ray output in 0.5-mm Pt. (P13, Ra)

359-P. Space-Charge Limited Hole Current in Germanium. G. C. Dacey. *Physical Review,* v. 90, June 1, 1953, p. 759-763.

Theory and experiment for hole flow in Ge at liquid air temperature. (P15, Ge)

360-P. Mobility of Holes and Electrons in High Electric Fields. E. J. Ryder. *Physical Review,* v. 90, June 1, 1953, p. 766-769.

Field dependence of mobility was determined for electrons and holes in Ge and Si. Graphs. (P15, Ge, Si)

361-P. High Field Mobility in Germanium With Impurity Scattering Dominant. E. M. Conwell. *Physical Review,* v. 90, June 1, 1953, p. 769-772.

Experimental measurements show a variation of mobility with electric field intensity of electrons in *n*-type Ge which differs at 20° K. from that observed in the same specimen at 77° K. and higher temperatures. (P15, Ge)

362-P. Gamma-Gamma Directional Correlations in Co^{60}, Xe^{131}, and Hg^{198}. D. Schiff and F. R. Metzgers. *Physical Review,* v. 90, June 1, 1953, p. 849-852.

Directional correlations of low intensity γ−γ cascades were measured using NaI scintillation counters in a coincidence arrangement of 1.5×10^{-8} sec. resolving time. Graphs. (P13, Co, Hg)

363-P. Search for Double Beta-Decay in Sn^{124} and Zr^{96}. John A. McCarthy. *Physical Review,* v. 90, June 1, 1953, p. 853-857.

Results which indicate that double β-decay may occur in Zr^{96} without the emission of neutrons. (P13, Zr, Sn)

364-P. Resonance Scattering in Indium. L. B. Borst. *Physical Review,* v. 90, June 1, 1953, p. 859-862.

Resonance scattering from the 1.458-ev level of In was studied by a bright-line technique. Graphs. (P10, In)

365-P. The Disintegration of Sc^{47}. L. S. Cheng and M. L. Pool. *Physical Review,* v. 90, June 1, 1953, p. 886-888.

Radiations accompanying the disintegration of Sc^{47} were investigated with a lens spectrometer and a scintillation spectrometer. Graphs. (P13, Sc)

366-P. Disintegration of 24-Minute Ag^{106}. W. L. Bendel, F. J. Shore, H. N. Brown, and R. A. Becker. *Physical Review,* v. 90, June 1, 1953, p. 888-890.

The 24-min. isomer of Ag^{106} was produced by the (γ, n) reaction on metallic Ag. A conversion line of a 512-kev γ-ray was found. Conversion lines of 66-min. half-life were found in Ag following bombardment of Pd by deuterons. (P13, Ag, Pd)

367-P. The Multiplicity of Neutrons From the Interaction of μ-Mesons at Rest in Pb, Bi, Sn, and Al. M. Widgoff. *Physical Review,* v. 90, June 1, 1953, p. 891-899.

Average multiplicity of neutrons emitted from a nucleus which has absorbed a μ-meson were determined. Graphs, tables.
(P10, Pb, Bi, Sn, Al)

368-P. Electron Spin Resonance in a Silicon Semiconductor. A. M. Portis, A. F. Kip, C. Kittel, and W. H. Brattain. *Physical Review*, v. 90, June 1, 1953, p. 988-989.

Study of electron spin resonance absorption in the 9000 megacycle per sec. range in a powdered *n*-type Si semiconductor specimen at temperatures between 4 and 300° K.
(P15, Si)

369-P. Decay of Ga^{64} and Ga^{65}. Bernd Crasemann. *Physical Review*, v. 90, June 1, 1953, p. 995-996.

Experiments. (P13, Ga)

370-P. Formation and Decay of Mo^{99m}. C. W. Forsthoff, R. H. Goeckermann, and R. A. Naumann. *Physical Review*, v. 90, June 1, 1953, p. 1004-1005.

Experimentation. (P13, Mo)

371-P. The Photodisintegration Cross Section of Beryllium at 2.185 Mev. Bernard Hamermesh and Clyde Kimball. *Physical Review*, v. 90, ser. 2, June 15, 1953, p. 1063-1065.

Measurement of the cross section using γ-rays. Graphs, table. 11 ref.
(P10, Be)

372-P. The Neutron Activation of Ca. L. G. Cook and K. D. Shafer. *Physical Review*, v. 90, ser. 2, June 15, 1953, p. 1121.

Describes irradiated Ca. 5 ref.
(P10, Ca)

373-P. Neutron Capture Cross Section of Em^{222}. A. P. Baerg. *Physical Review*, v. 90, ser. 2, June 15, 1953, p. 1121.

Experiments measuring the cross section of Rn for slow neutron capture in the RX reactor. Table.
(P10, Rn)

374-P. The Optical Constants of a Single Crystal of Germanium. D. G. Avery and P. L. Clegg. *Physical Society, Proceedings*, v. 66, sec. B, June 1953, p. 512-513.

Graphs. 6 ref. (P17, Ge, Pb)

375-P. The Thermal Conductivity of Gold at Low Temperatures. G. K. White. *Physical Society, Proceedings*, v. 66, sec. A, June 1953, p. 559-564.

Cryostat, experimental technique, and results. Diagrams. 14 ref.
(P11, Au)

376-P. A Simple Varying Capacitor Method for the Measurement of Contact Potential Difference in High Vacuum. H. P. Myers. *Physical Society, Proceedings*, v. 66, sec. B, June 1953, p. 493-499.

Apparatus based on Kelvin's method for measuring contact potential difference, suitable for use in vacua of 10^{-8}mm. Hg. Diagram. 4 ref.
(P15, Cu, Ag, Hg)

377-P. (German.) Properties of Silver Separated by Electrodeposition Dependent on Separation Conditions. Paul Walter. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. B32-B35.

Reaction polarization as the determinative influence which is applicable to metals of high melting point. Graphs. 3 ref. (P15, C28, Ag)

378-P. The Electrical Resistivity of Cast Iron. K. B. Palmer. *British Cast Iron Research Association*, v. 4, June 1953, p. 571-585.

Summary of literature on electrical resistivity and results obtained from bars cast in the BCIRA laboratories. Tables. 8 ref. (P15, CI)

379-P. An Instability of Self-Saturating Magnetic Amplifiers Using Rectangular Loop Core Materials. S. B. Batdorf and W. N. Johnson. *Communication and Electronics*, July 1953, p. 223-227; disc., p. 227-228.

On basis of experimental data a simple phenomenological theory was developed to account for the B-H characteristics of rectangular hysteresis loop core material such as "Hipernik V". Diagrams.
(P16, SG-n)

380-P. Simultaneous Determination of the Surface Tension of Tin and Its Contact Angle With Silica by the Use of Conical Capillaries. D. V. Atterton and T. P. Hoar. *Institute of Metals, Journal*, v. 81, July 1953, p. 541-551.

Graphs, diagrams, tables. 17 ref.
(P10, Sn)

381-P. Alternating-Current Energy Losses in Iron Laminations at Magnetic Saturation. F. Brailsford and C. G. Bradshaw. *Nature*, v. 172, July 4, 1953, p. 35-36.

Method for determining specific iron losses of materials used for alternating flux densities greater than 75% saturation value. (P16, Fe)

382-P. The Specific Heat Discontinuity in Antiferromagnets and Ferrites. Louis N. Howard and J. Samuel Smart. *Physical Review*, v. 91, ser. 2, July 1, 1953, p. 17-19.

Calculations show that in a molecular field approximation, internal energy and specific heat of a ferromagnet and antiferromagnet have the same form. Number of sets of neighbors whose interactions are considered and of the signs of the interactions have no effect. Graphs. 9 ref. (P12)

383-P. Hall Effects of the Cobalt Nickel Alloys and of Armco Iron. Simon Foner and Emerson M. Pugh. *Physical Review*, v. 91, ser. 2, July 1, 1953, p. 20-27.

Experimental data and use of a two-band model. Diagrams, graphs. 25 ref. (P15, Co, Ni, Fe)

384-P. Some Magnetic Properties of Gadolinium Metal. J. F. Elliott, S. Legvold, and F. H. Spedding. *Physical Review*, v. 91, ser. 2, July 1, 1953, p. 28-30.

Saturation magnetization and Curie point determinations of Gd. Graphs. 8 ref. (P16, Gd)

385-P. The Parameters for the Slow Neutron Resonance in Rhodium. V. L. Sailor. *Physical Review*, v. 91, ser. 2, July 1, 1953, p. 53-57.

Accurate values of the Dreit-Wigner parameters and shape of the resonance. Graphs, tables. 16 ref. (P16, Rh)

386-P. The Disintegration of Sr^{91} and Y^{91m}. D. P. Ames, M. E. Bunker, L. M. Langer, and B. M. Sorenson. *Physical Review*, v. 91, ser. 2, July 1, 1953, p. 68-74.

Data on the decay of Sr and Y. Graphs, tables. 13 ref.
(P13, Sr, Y, Zr, Al, Fe)

387-P. Gallium-64. Bernard L. Chohen. *Physical Review*, v. 91, ser. 2, July 1, 1953, p. 74-75.

New isotope. Graphs. (P13, Ga)

388-P. The Decay of Au^{197m}. J. W. Mihelich and A. De-Shalit. *Physical Review*, v. 91, ser. 2, July 1, 1953, p. 78-81.

Experimental procedure and a consistent decay scheme. Tables, graph. 12 ref. (P13, Au, Hg)

389-P. Ferromagnetic Domains. H. J. Williams. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 251-277.

Very simple process of showing the above by using colloidal magnetite and microscope. Magnetic orientation is shown by magnetite behavior at fine mechanical scratches. Some Kerr magneto-optic work. (P16, SG-n)

390-P. Radiation Damage as a Metallurgical Research Technique. Sidney Siegel. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 312-325.

Irradiation of Cu, an order-disorder alloy (Cu_3Au), and a precipitation-hardening alloy (Cu plus 2% Be). Effect on electrical conductance was greater than theoretical predictions. (P10, P15, Cu)

391-P. (French.) Study of Thermodynamic Properties of the Reductions of Oxides of Tungsten by Hydrogen and Carbon Monoxide (and Direct Reduction of the WO_3 Anhydride at High Temperature). Jean Venturini. *Métaux, Corrosion-Industries*, v. 28, no. 331, Mar. 1953, p. 102-126.

Thermochemistry of reactions of dissociation, oxidation, and reduction of oxides of W. Tables, graphs. 35 ref. (P12, W)

392-P. (Russian.) On Chemical Transformations Preceding Ordering of a 50% Alloy of Iron With Cobalt. N. V. Grum-Grzhimailo. *Doklady Akademii Nauk SSSR*, v. 87, new ser. no. 1, Nov. 1, 1952, p. 57-58.

Variation of the galvanomagnetic effect with increasing temperatures from 25 to 800° C. 4 ref.
(P16, Fe, Co)

393-P. (Russian.) Effect of Surface Active Substances on the Electrode Potential. A. I. Levin, E. A. Ukshe and V. S. Kolevatova. *Doklady Akademii Nauk SSSR*, v. 87, new ser. no. 1, Nov. 1, 1952, p. 97-100.

Effect of very small additions of various substances on the magnitude of the electrode potential of Zn and Cu. Tables. 9 ref.
(P15, Zn, Cu)

394-P. (Russian.) Ferromagnetic Resonance in Parallel Conductors as Dependent on Temperature and Hysteresis. A. G. Kotov. *Doklady Akademii Nauk SSSR*, v. 87, new ser. no. 3, Nov. 21, 1952, p. 373-375.

Resonance curves for Ni at 25 and 80° at 18 kg. per min. tension and 3.2 cm wavelength Graphs. 6 ref. (P16, Ni)

395-P. (Russian.) Device for the Thermomagnetic Processing of Permanent Magnets. Ia. M. Dovgalevskii. *Promyshlennaia Energetika*, v. 9, no. 8, Aug. 1952, p. 7-9.

New 2-section fixed magnetizing apparatus which accelerates the preparation of permanent magnets from anisotropic alloys. Drawing, photograph. (P16, SG-n)

396-P. (Book.) Introduction to Solid State Physics. Charles Kittel. 396 p. 1953. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $7.00.

Classification of solids and crystal structure, lattice energy of ionic crystals, elastic constants of crystals, lattice vibrations, thermal properties of solids, dielectric properties, and ferro-electric crystals are among the topics covered. Includes diamagnetism and paramagnetism, ferromagnetism and antiferromagnetism, superconductivity, free electron and band theory of models, semiconductors, and imperfections in solids.
(P general, Q21, N general)

397-P. (Book.) Permanent Magnets. 59 p. Permanent Magnet Assoc., 301 Glossop Rd., Sheffield 10, England. 10s net.

Development work done at Permanent Magnet Assoc. and recent achievements in the field. Includes theory of magnetism, magnet design, compositions and properties of magnetic materials, and a glossary of technical terms. (P16, SG-n)

398-P. (Book.) Progress in Metal Physics. v. 4. Bruce Chalmers, editor. 403 p. 1953. Interscience Publishers, Inc., 250—5th Ave., New York 1, N. Y. $9.00.

Authoritative information on the current state of knowledge in specialized aspects of the field that includes both physical metallurgy and metal physics.
(P general, M general, N general)

Q

Mechanical Properties and Test Methods; Deformation

535-Q. Textures of Rolled and Annealed Iodide Zirconium. J. H. Keeler, W. R. Hibbard, Jr., and B. F. Decker. *Journal of Metals*, v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 932-936.

Textures of hot rolled, cold rolled, and cold rolled and annealed Zr sheets were determined by use of an X-ray spectrogoniometer. Experimental procedure and results. Diagrams. 8 ref. (Q24, Zn)

536-Q. An Ethoxylene Resin for Photoelastic Work. H. Spooner and L. D. McConnell. *British Journal of Applied Physics*, v. 4, June 1953, p. 181-184.

More important properties of the material. Opportunities for increased precision in photo-elastic work. Typical examples of its use, major defects of the material (mottle and the development of time-edge stress). (Q25)

537-Q. Compressive Buckling of Stiffened Plates. B. H. Falconer and J. C. Chapman. *Engineer*, v. 195, June 5, 1953, p. 789-791; June 12, 1953, p. 822-825.

Preliminary study of critical and post-buckling behavior of long, simply supported rectangular plates having any degree of longitudinal and transverse stiffening when subjected initially to uniform end thrusts. Graphs. (Q28)

538-Q. Aluminium as a Structural Material. M. Bridgewater. *Engineering*, v. 175, June 12, 1953, p. 762-765; June 19, 1953, p. 793-795.

Properties of Mg-Si-Al alloy H10 regarding specification, stress-strain curve, Young's modulus, corrosion, density, elongation, and fatigue. Design problems including deflections, instability, buckling, torsional failure, and lateral instability. Recent examples of Al structures. Graphs, photographs. 9 ref. (Q general, T26, Al)

539-Q. Why Metals Are Weak. J. C. Fisher. *General Electric Review*, v. 56, July 1953, p. 15-17.

Deformation of crystals. Diagrams. (Q24)

540-Q. The Continuity of Slip Lines Across a Grain Boundary. G. J. Ogilvie. *Institute of Metals, Journal*, v. 81, June 1953, p. 491-495.

Effect of slip planes on crystallographic structure. Graphs, diagrams, tables, photographs. 5 ref. (Q24, Cu, Al)

541-Q. How to Reduce Failures in High Temperature Alloys. W. E. Jones. *Iron Age*, v. 172, July 9, 1953, p. 137-141.

Mechanical properties which influence failures. Micrographs. (Q general, SG-h)

542-Q. Effects of Nuclear Radiations on the Mechanical Properties of Solids. G. J. Dienes. *Journal of Applied Physics*, v. 24, June 1953, p. 666-674.

Nature of radiation effects, detailed effects of nuclear radiation on mechanical properties of solids, and some suggested experiments for further insight. 78 ref. (Q general)

543-Q. Stresses Due to Tangential and Normal Loads on an Elastic Solid With Application to Some Contact Stress Problems. J. O. Smith and Chang Kong Liu. *Journal of Applied Mechanics*, v. 20, June 1953, p. 157-166; *American Society of Mechanical Engineers, Transactions*, v. 75.

Results of two-dimensional approach using real variable method of Hertz's problem of contact of elastic bodies. It is shown that when the combination of loads is applied at the contact area the maximum shearing stress may be at the surface. Effect of range of normal and shearing stresses in the plane of maximum shear and in the plane of maximum octahedral shear on failure by progressive fracture (fatigue). Diagrams. (Q2, Q7)

544-Q. Forced Lateral Vibration of Beams on Damped Flexible End Supports. D. F. Miller. *Journal of Applied Mechanics*, v. 20, June 1953, p. 167-172; *American Society of Mechanical Engineers, Transactions*, v. 75.

Steady-state forced-vibration problem for a beam or rotating shaft on damped, flexible end supports is solved. Diagrams. (Q9)

545-Q. Frequencies of Longitudinal Vibration for a Slender Rod of Variable Section. James L. Lubkin and Yudell L. Luke. *Journal of Applied Mechanics*, v. 20, June 1953, p. 173-177; *American Society of Mechanical Engineers, Transactions*, v. 75.

Natural frequencies of a slender, homogeneous, fixed-free rod of variable section are studied in a one-dimensional theory. First few terms of asymptotic expansions for the roots of the frequency equation are presented. (Q9)

546-Q. On the Plastic Strains in Slabs With Cutouts. P. G. Hodge, Jr. *Journal of Applied Mechanics*, v. 20, June 1953, p. 183-188; *American Society of Mechanical Engineers, Transactions*, v. 75.

Complete elastic-plastic problem is set up for a circular slab with a central circular cutout subjected to uniform external tension. Analysis is carried out under the assumption of generalized plane stress but with possibly finite deformations. Equations are solved by a perturbation method based on the ratio of the maximum shear stress to the shear modulus, in which each of the significant quantities, stress, displacement, and slab thickness, is expanded in a power series. (Q21, Q27)

547-Q. Response of an Elastic Cylindrical Shell to a Transverse, Step Shock Wave. R. D. Mindlin and H. H. Bleich. *Journal of Applied Mechanics*, v. 20, June 1953, p. 189-195; *American Society of Mechanical Engineers, Transactions*, v. 75.

An approximate mathematical solution is obtained for the elastic response of a shell encountering a shock wave with wave front parallel to the cylinder's axis. Graphs. (Q21, Q6)

548-Q. The Origin of Damping in High-Strength Ferromagnetic Alloys. A. W. Cochardt. *Journal of Applied Mechanics*, v. 20, June 1953, p. 196-200; *American Society of Mechanical Engineers, Transactions*, v. 75.

Theoretical analysis and test data which explain the damping capacity of standard high-strength alloys in terms of the magnetostrictive effect. Conditions for obtaining maximum damping and results of experiments which provide basis for the development of high-strength high-damping alloys. Graphs. (Q8, SG-n)

549-Q. Effect of Damping Constants and Stress Distribution on the Resonance Response of Members. B. J. Lazan. *Journal of Applied Mechanics*, v. 20, June 1953, p. 201-209; *American Society of Mechanical Engineers, Transactions*, v. 75.

Amplitude of vibration of a member at resonance, as defined by its resonance amplification factor, is analyzed in relationship to the damping properties of materials. Data on damping energy indicate the effect of stress magnitude, stress history, and temperature. Experimental data are presented to confirm the equations derived for resonance amplification factor of members having various shapes and stress distribution. Diagrams. (Q8)

550-Q. Deflections of Circular Beams Resting on Elastic Foundations Obtained by Methods of Harmonic Analysis. Enrico Volterra. *Journal of Applied Mechanics*, v. 20, June 1953, p. 227-232; *American Society of Mechanical Engineers, Transactions*, v. 75.

Solutions in form of Fourier series are given for the problem of circular beams resting on elastic foundations on the assumption that the foundation reacts according to the classical Winkler-Zimmermann hypothesis. Numerical tables of the coefficients of trigonometric series expressing deflections, angles of twist, bending, and twisting moments for both symmetric and antisymmetric loadings. Diagrams. (Q21)

551-Q. Natural Frequencies of Twisted Cantilever Beams. D. D. Rosard. *Journal of Applied Mechanics*, v. 20, June 1953, p. 241-244; *American Society of Mechanical Engineers, Transactions*, v. 75.

Experimental and analytical investigation of the effect of twist for various width-to-thickness ratios. Diagrams, photographs. (Q1)

552-Q. An Analytical Theory of the Creep Deformation of Materials. Yoh-Han Pao and Joseph Marin. *Journal of Applied Mechanics*, v. 20, June 1953, p. 245-252; *American Society of Mechanical Engineers, Transactions*, v. 75.

Theory is proposed for an idealized material. Takes into account initial elastic strain, transient creep strain, and minimum rate creep strain. Diagrams. (Q3)

553-Q. Axisymmetric Flexural Temperature Stresses in Circular Plates. J. E. Goldberg. *Journal of Applied Mechanics*, v. 20, June 1953, p. 257-260; *American Society of Mechanical Engineers, Transactions*, v. 75.

Theoretical analysis. Diagrams. (Q25)

554-Q. Transient Thermal Stresses in Slabs and Circular Pressure Vessels. M. P. Heisler. *Journal of Applied Mechanics*, v. 20, June 1953, p. 261-269; *American Society of Mechanical Engineers, Transactions*, v. 75.

Results of computations for determining transient thermal stresses in slabs and circular pressure vessels. Process of solution is to substitute transient-temperature formulas into the already available stress expressions. A new dimensionless stress parameter is defined and applied to the determination of optimum heating or cooling times of massive pressure vessels. Graphs. (Q25)

555-Q. The Shearing of a Rectangular Block Between Rough Plates. J. W. Craggs. *Journal of Applied Mechanics*, v. 20, June 1953, p. 270-272; *American Society of Mechanical Engineers, Transactions*, v. 75.

Analytical solution. Method used is a particular case of the general method described by G. Pickett. (Q2)

556-Q. The Torsion of Spiral Rods. H. Okubo. *Journal of Applied Mechanics*, v. 20, June 1953, p. 273-278; *American Society of Mechanical Engineers, Transactions*, v. 75.

Mathematical analysis. (Q1)

557-Q. Reinforced Circular Holes in Bending With Shear. S. R. Heller, Jr. *Journal of Applied Mechanics*, v. 20, June 1953, p. 279-285; *American Society of Mechanical Engineers, Transactions*, v. 75.

Determination of the reinforcement effect of circular holes on the stress distribution in webs of beams subjected to bending with shear. Theoretical solution for a bead-type reinforcement. Diagrams. (Q5, Q2)

558-Q. The Creep of Zinc Single Crystals Under Direct Shear. Elliot H. Weinberg. *Journal of Applied Physics*, v. 24, June 1953, p. 734-744.

Method and results of the creep effect under direct shear and compares the Bauschinger effect. Graphs, tables. 26 ref. (Q3, Q2, Zn)

559-Q. Pure Gliding of Metal Crystals. Hiroshi Kanzaki. *Journal of Applied Physics*, v. 24, June 1953, p. 811.

Evidence that the difference between stress-strain curves obtained in pure gliding and those obtained in the usual tensile test is not as large as described by Rohm. 2 ref. (Q25, Q23, Al)

560-Q. Flange Buckling in a Bent I-Section Beam. J. F. Davidson. *Journal of the Mechanics and Physics of Solids*, v. 1, Apr. 1953, p. 149-163.

Theoretical analysis. Graphs, diagrams, tables. (Q28)

561-Q. On the Generality of the Cubic Creep Function. A. J. Kennedy. *Journal of the Mechanics and Physics of Solids*, v. 1, Apr. 1953, p. 172-181.

Application of cubic creep function to a wide variety of materials with results compared with the application to a general power law. Statistical approach to the problem. Graphs, tables. (Q3)

562-Q. The "Elastic Hysteresis" of Uranium. E. R. W. Jones and W. Munro. *Journal of the Mechanics and Physics of Solids*, v. 1, Apr. 1953, p. 182-188.

Experiments using wrought U. Tables, graphs. (Q21, U)

563-Q. The Combined Bending and Twisting of Thin Cylinders in the Plastic Range. M. P. L. Siebel. *Journal of the Mechanics and Physics of Solids*, v. 1, Apr. 1953, p. 189-206.

Investigation to test validity of theories under conditions where the plastic and elastic components of the strain increments are comparable and where stresses and the strains are not uniformly distributed. Diagrams, graphs. (Q5, Q1)

564-Q. On the Plastic Distortion of Solid Bars by Combined Bending and Twisting. R. Hill and M. P. L. Siebel. *Journal of the Mechanics and Physics of Solids*, v. 1, Apr. 1953, p. 207-214.

Experimental moment-angle relations for steel bars of circular section plastically strained by combined bending and twisting couples in constant ratio. Tables, graphs. (Q5, Q1, ST)

565-Q. Further Progress in the Development of Mg-Zr Alloys to Give Good Creep and Fatigue Properties Between 500° and 650° F. C. J. Ball, A. C. Jessup, P. A. Fisher, D. J. Whitehead, and J. B. Wilson. *Journal of Metals*, v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 924-931.

Properties of a new Mg alloy ZT1. ZT1 is shown to be superior to zinc-free Mg-Th-Zr alloys. Graphs, tables. 15 ref. (Q3, Q7, Mg, Zr)

566-Q. Anelastic Behavior of Pure Gold Wire. Donald R. Mash and Lewis D. Hall. *Journal of Metals*, v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 937-942.

Results of experiments on the anelastic behavior of Au, as manifested by grain boundary relaxation. Two grain boundary internal friction peaks are found for 99.9998% Au. It is suggested that grain boundary stability, as determined by orientation, plays a role in the observed effects. Graphs, micrographs. 9 ref. (Q22, M27, Au)

567-Q. The Mechanism of Fretting. I-Ming Feng and B. G. Rightmire. *Lubrication Engineering*, v. 9, June 1953, p. 134-136, 158-161.

A mechanism of fretting based on a new mechanism of wear. Experimental results obtained are cited for supporting this mechanism. Diagrams. (Q9)

568-Q. Shearing Stress in Thin Section Beams. J. Jennings. *Mechanical World and Engineering Record*, v. 133, May 1953, p. 198-201.

Fundamental principles and examples of their application. Diagrams. (Q2)

569-Q. Fatigue Strength and Electroplating. R. H. Warring. *Mechanical World and Engineering Record*, v. 133, May 1953, p. 206-208.

Method to eliminate reduced fatigue strength of Ni and Cr plated steel specimens. Tables, graphs. (Q7, L17, Ni, Cr, ST)

570-Q. Steels for Welding. G. Erber. *Mechanical World and Engineering Record*, v. 133, May 1953, p. 210-212.

Structural and 3-dimensional stress brittleness as factors to consider in selection. (Q23, K general, ST)

571-Q. Embrittlement of Low-Phosphorus Phosphorus "Deoxidised" Coppers. B. T. Houlden and W. A. Baker. *Metallurgia*, v. 47, no. 283, May 1953, p. 223-229.

Embrittlement tests and results. Micrographs, tables. 8 ref. (Q23, Cu)

572-Q. Axial-Load Fatigue Properties of 24S-T and 75S-T Aluminum Alloy as Determined in Several Laboratories. H. J. Grover, W. S. Hyler, Paul Kuhn, Charles B. Landers, and F. M. Howell. National Advisory Committee for Aeronautics, Washington, D. C., Technical Note 2928, May 1953, 63 p.

Tests at Battelle Memorial Institute, Langley Aeronautical Laboratory, and Aluminum Co. of America. Test techniques and results compared with results obtained on unpolished sheet by the National Bureau of Standards. (Q7, Al)

573-Q. Concepts of the Effective Modulus of Elasticity. Abraham Slavin. *New York Academy of Sciences, Transactions*, Ser. II, v. 15, Mar. 1953, p. 145-152.

Chronology and mathematical concepts of the effective (reduced) modulus of elasticity, and the Slavin moduli of elasticity, based on simplified linear mathematical relations. Diagrams. 17 ref. (Q21)

574-Q. Transient Creep in Pure Metals. O. H. Wyatt. *Physical Society, Proceedings*, v. 66, sec. B, June 1953, p. 459-480.

Constant stress testing machine of small inertia and a theory of creep. Diagrams, graphs. 7 ref. (Q3, Cu, Al, Cd)

575-Q. Room Temperature Brittleness of Chromium. H. L. Wain and F. Henderson. *Physical Society, Proceedings*, v. 66, sec. B, June 1953, p. 515-517.

Experiment on causes of room-temperature brittleness. Photograph. 6 ref. (Q23, Cr, SS)

576-Q. On the Theory of Internal Friction in Metals. B. V. Paranjape. *Physical Society, Proceedings*, v. 66, sec. A, June 1953, p. 572-575.

Data show that at high frequencies there is considerable interaction between elastic vibrations of the lattice and the conduction electrons. 4 ref. (Q22)

577-Q. The Plastic Yielding of Notched Bars Due to Bending. A. P. Green. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 6, pt. 2, June 1953, p. 223-239.

Problem of estimating loads sufficient to cause pronounced plastic yielding. Diagrams, graphs, photographs, tables. 5 ref. (Q23, Q5, Cu, SS, ST)

578-Q. A Note on the Finite Extension and Torsion of a Circular Cylinder of Compressible Elastic Isotropic Material. A. E. Green and E. W. Wilkes. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 6, pt. 2, June 1953, p. 240-249.

Considers the above with no special assumptions about the strain-energy function. Two cases discussed. 11 ref. (Q1)

579-Q. The Plate Analogy as a Means of Stress Analysis. J. J. Ryan. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 7-28.

Through the application of Cranz' method under strict control and the comparison of the results obtained with corresponding results by photo-elasticity, the applicability of the plate analogy as a means of stress analysis is determined. Theory of plate analogy. Diagrams, graphs. 10 ref. (Q25)

580-Q. Improved Photogrid Techniques for Determination of Strain Over Short Gage Lengths. James A. Miller. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 29-34.

Methods for photographing on metal a grid of well-defined lines 0.0006 in. wide spaced 0.01 in. apart. Excellent definition of lines was obtained by using cold top enamel and Dyrite black contact emulsion. Applications of the method to the study of strain concentrations in the plastic range and a replica technique for use in measuring strain on curved surfaces. (Q25, Al)

581-Q. Some Phases of the Technique of Recording Performance Data on Large Machines. J. H. Meier. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 35-52.

Several items that were found practical in the course of recording performance characteristics of large machines. Advantage of reference signals in bridge work is stressed. Formulas for relating reference signals to corresponding strains. Method for calculating strain when the various gages in a bridge circuit have different orientation with respect to the stress field. Diagrams, photographs. (Q25)

582-Q. Stress Concentrations Produced by Multiple Semi-Circular Notches in Infinite Plates Under Uniaxial State of Stress. A. J. Durelli, R. L. Lake, and E. Phillips. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 53-64.

Photo-elastic solution of the problem for 1 to 5 notches for the case of uni-axial tension parallel to the plate edge. Graphs, stress patterns. 7 ref. (Q25)

583-Q. Mobile Instrumentation for Automotive Equipment. A. W. Colwell. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 65-76.

Resume of early test work and instrumentation. Present mobile equipment and how it satisfies needs for measuring structural working stresses. Photographs. (Q25)

584-Q. The TMB Strain Cycle Gage and Counter. An Instrument for the Statistical Determination of the Strain History of Structures. N. H. Jasper. *Society for Experimental Stress Analy-*

sis, v. 10, no. 1, 1952, p. 87-96.

Development of a gage to obtain strain data in a form in which it could be readily used without laborious analysis. Diagrams, photographs. (Q25)

585-Q. Residual Stresses in Surface-Hardened Oil Field Pump Rods. R. E. Hanslip. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 97-111.

Method of determining residual stresses in a solid round rod by removing concentric layers of metal from inside and outside surfaces. Longitudinal residual stresses of flame-hardened, induction-hardened, and gas-carburized rods. Graphs, photographs. 6 ref. (Q25, J2, CN)

586-Q. Determination of Dynamic Stress-Strain Curves From Strain Waves in Long Bars. W. R. Campbell. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 113-124.

Method for experimentally deriving the relation between stresses and strains set up in a long bar by a deformation being propagated as a longitudinal plane wave. Analytical concepts and experimental technique. Results of preliminary tests which demonstrate the application of the method for Cu bars subjected to longitudinal impact. Diagrams, graphs. 11 ref. (Q27, Q25, Cu)

587-Q. Telemetering, Recording, and Analyzing Shock and Vibration Data. C. B. Cunningham. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 125-134.

Special techniques devised to collect and analyze vibration data gathered at locations on ships, aircraft, rockets, and missiles. Graphs. (Q6, Q9)

588-Q. A Mechanical Deflection Gage. An Instrument for Measuring Displacement Under Impact. D. D. MacLaren, I. J. Taylor, and L. S. Beedle. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 135-146.

Construction of the "mechanical deflection gage", its principles and operation. Analysis of records obtained. Photographs. (Q6)

589-Q. Measurement of the Resistance of Materials to Mechanical Shock. T. E. Pardue and B. Goldberg. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 147-156.

Comparison of shock data with results from other mechanical tests shows the common mechanical properties to be inadequate criteria of shock resistance. Ductility of a material and its ability to absorb energy are found to be among the most significant factors. Tables, photographs. (Q6, Al)

590-Q. Impulsive Loads on Beams. William H. Hoppmann, II. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 157-164.

Series of hinged beams were investigated theoretically and experimentally to study strains and deflections of a beam subjected to an intensive force of short duration compared with the period of the fundamental mode. Graphs. (Q5, ST)

591-Q. Properties of Bolts Under Shock Loading. H. M. Forkois, R. W. Conrad, and I. Vigness. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 165-178.

Investigation of the determination of the loads on commonly used types of bolts when subjected to types of shocks that may be expected aboard combat-type naval ships. Determination of good designs and materials for holding-down bolts subject to these shocks. Diagrams, graphs. 7 ref. (Q6, CN)

592-Q. Elastic and Creep Properties of Stresscoat. William F. Stokey. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 179-186.

Methods for measuring elastic constants of "Stresscoat". Summary of results. 8 ref. (Q21, Q3, Q25)

593-Q. The Measurement of Turbine Stresses in Aircraft Engines in the Laboratory, on the Test Bed and in Flight. Denis A. Drew. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 187-202.

Equipment and techniques employed for the study of turbine stresses. Diagrams, photographs. (Q25)

594-Q. Longitudinal Impact of Cylindrical Bars. E. A. Ripperger. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 209-226.

Technique for measuring strains developed by the longitudinal impact of bars. Technique was used to study the effects of various types of restraints on the propagation of a strain wave along a slender cylindrical rod. Experimental results are compared to the results predicted by the elementary theory. Diagrams. 13 ref. (Q6, Q25, ST)

595-Q. Stress Analysis of a Pipe Wrench. G. H. Eisenhardt and W. L. Walsh. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 227-234.

Investigation of strain distribution in a 14-in. pipe wrench. Diagrams, photographs. (Q25)

596-Q. A Method of Waterproofing Electrical Strain Gages. Hans Otto Meyer. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 243-245.

Method for waterproofing an electrical strain gage on a surface which is to be submerged in sea water. Photographs. (Q25, R10)

597-Q. The SR-4 Type Equilateral Fleximeter. G. A. Brewer. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 1-8.

Describes the "Equilateral Fleximeter", developed to permit the determination of midplane stresses from external measurements alone in structures having an inaccessible surface. Diagrams, graphs, tables. (Q25)

598-Q. Determination of Centrifugal Stresses in a Turbosupercharger Impeller by Means of Stresscoat. W. G. Schmittner. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 9-22.

Test apparatus, methods, and results. Photographs. (Q25)

599-Q. Application of Optical Interference to the Study of Residual Surface Stresses. Harold R. Letner. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 23-36.

Advantages of optical interference when used in conjunction with the technque of removing uniform layers of stressed material from surfaces of rectangular specimens of uniform cross-section and measuring resulting deflections. Its adaptability to two-dimensional stress systems. Necessary apparatus and experimental procedures. Diagrams. 18 ref. (Q25, TS)

600-Q. Strength-Stress Life of Helical Gear Teeth. E. J. Wellauer. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 37-52.

Method of approach, scope of tests, and analysis of data. Test procedures and results. Photographs. (Q25, ST)

601-Q. Full Scale Testing of Trailer Structures. P. J. Jung. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 53-64.

Static and mobile equipment used to strain test full-scale prototypes of freight-carrying trailers. Diagrams, photographs. (Q25, Al, CN)

602-Q. Experimental Determination of Foundation Modulus of Elastically Supported Bars and Rings. Edward Wenk, Jr. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 65-78.

Experimental procedure which consists of subjecting prototype structure to steady-state forced vibration during which time the resonant frequencies and modes of vibration are measured. Calculations are then performed using the frequency equations for an elastically supported bar or ring in which the foundation modulus is considered the unknown quantity. Diagrams, tables. 9 ref. (Q21)

603-Q. Further Results on the Tuned Test Mass Method of Vibration Testing. Samuel J. Loring. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 79-92.

Study of the response of the test mass when structural vibrations are excited by either an impulse or a suddenly released load applied at a point on the structure and in a direction which may be different from the direction and point of attachment of the test mass. Tables. 8 ref. (Q9)

604-Q. A Method of Evaluating Loose-Blade Mounting as a Means of Suppressing Turbine and Compressor Blade Vibration. M. P. Hanson, A. J. Meyer, Jr., and S. S. Manson. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 103-116.

Techniques involved in the determination of root damping. Diagrams, graphs. (Q8, Al, N, SS)

605-Q. Application of Xenon Flashtube to Scattered Light Polariscope. Peter L. Balise. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 117-126.

Use of scattered light in three-dimensional photo-elasticity for the analysis of stress systems to which the standard two-dimensional polariscope is not applicable. Adaptation of a high-speed polariscope to scattered light photo-elasticity. 12 ref. (Q25)

606-Q. Instrumentation and Fundamental Experiments in Plasticity. D. C. Drucker and F. D. Stockton. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 127-142.

Basic experiments on the behavior of thin-walled Al alloy tubes in the plastic range. Techniques of measurement. Diagrams, graphs. (Q23, Al)

607-Q. A Dual-Amplitude Axial-Load Fatigue Machine. A. E. McPherson. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 143-152.

Machines which provide a means of applying a combination of two sinusoidally varying axial loads of different amplitudes with the mean load remaining constant. Each load is applied for a predetermined number of cycles. Diagrams, photographs. (Q7, Al)

608-Q. The Effect of Superposition of Stress Raisers on Members Subjected to Static or Repeated Loads. A. Q. Mowbray, Jr. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 153-166.

Study of the decrease in the strength of members produced by compound notches in the form of grooves superposed upon fillets. Significance of the results of tests in the design of load-resisting members. Diagrams, graphs, tables. 8 ref. (Q25, AY)

609-Q. The Behavior of SR-4 Wire Resistance Strain Gages on Certain Materials in the Presence of Hydrostatic Pressure. W. R. Clough, M.

E. Shank, and Melvin Zaid. *Society for Experimental Stress Analysis*, v. 10, no. 2, 1952, p. 167-176.

Use of a pressure calibration method to investigate strains in small grey cast iron and nodular iron pressure vessels. Parameter method of determining the material bulk modulus for such materials with nonlinear stress-strain characteristics was developed in order to check the accuracy of linear corrections for pressure effects on gages used on such materials. Graphs. 6 ref. (Q25, CI)

610-Q. A Mechanism for Controlling Large-Scale Fatigue Testing Machines. W. J. Hall and G. K. Sinnamon. *Society for Experimental Stress Analysis*, v. 10, no. 1, 1952, p. 203-208.

Program to design and fabricate a control mechanism to replace or modify the existing turnbuckle and variable eccentric of a 50,000-lb. machine and be capable of functioning automatically with the machine in operation. Diagrams. (Q7)

611-Q. Development of Weldable High-Tensile Structural Steels. L. Reeve. *Welder*, v. 22, Apr.-June 1953, p. 40-44.

Post-war developments. Indicates various methods by which demands for improved steels have been met. (Q23, K general, ST)

612-Q. Hot Cracking of Steel Welds. E. C. Rollason. *Welder*, v. 22, Apr.-June 1953, p. 45-53.

Factors contributing to cracking of ferrous weld metal. Considers effects of welding technique, S, Mn, Ni, and C. Diagrams, micrographs. (Q26, K general, Mn, Ni, ST)

613-Q. The Problem of Brittle Fracture. C. F. Tipper. *Welder*, v. 22, Apr.-June 1953, p. 54-61.

Brittle fracture, testing for notch-brittleness, and factors effecting fractures in mild steel. Graphs, micrographs. (Q26, Q23, CN)

614-Q. Machine for Testing Steel for Hot Workability and Results Obtained With It. R. Canard. Henry Brutcher Translation 2993, 7 pages. (From *Revue de Metallurgie*, v. 43, 1946, no. 5-6, p. 156-161.)

Development of a hot tensile impact testing machine. Particulars on design and use. Diagrams, graphs, photographs. (Q23, Q6, CN)

615-Q. Influence of Tin and Arsenic on Properties of Heat-Treating Steels. H. Krainer. Henry Brutcher Translation 3026, 3 pages.

Previously abstracted from *Stahl und Eisen*. See item 531-Q, 1953. (Q general, Sn, As, AY)

616-Q. (German.) **Screw Dislocations as Stress Centers in Martensite With a (225) Slip System.** Otto Krisement. *Archiv für das Eisenhüttenwesen*, v. 24, no. 3-4, Mar.-Apr. 1953, p. 191-198.

It was experimentally shown that the theory proposed by Kurdiumov and Sachs fulfills the requirements for this type of martensite. (Q25, Q24, ST)

617-Q. The Reaction of Metals to Force. P. C. Giles. *Aircraft Engineering*, v. 25, July 1953, p. 204-205.

Examination of fundamentals of resistance to stress with particular reference to the importance of ductility. Diagrams. (Q25, Q23, Al)

618-Q. Effect of Stress Amplitude on Statistical Variability in Fatigue Life of 75S-T6 Aluminum Alloy. G. M. Sinclair and T. J. Dolan. *American Society of Mechanical Engineers, Transactions*, v. 75, July 1953, p. 867-870; disc., p. 870-872.

Groups of 17 to 57 specimens of 75S-T6 Al alloy were tested in rotating bending at six different stress levels. Results of the study are summarized in two equations and in a composite S-N diagram showing lines of equal probability of failure. Tables, graphs. (Q7, Al)

619-Q. Grinding and Lapping Stresses in Manganese Oil-Hardening Tool Steel. H. R. Letner and H. J. Snyder. *American Society of Mechanical Engineers, Transactions*, v. 75, July 1953, p. 873-880; disc., p. 881-882.

Biaxial stress distributions resulting from grinding and lapping annealed Mn oil-hardening toolsteel were determined by sectioning the stressed surface layers and following the changes in curvature of the test specimens by optical interferometry. Two methods of sectioning, lapping, and chemical etching were tested and evaluated. Photographs, graphs. 12 ref. (Q25, G18, G19, TS)

620-Q. Properties of Automobile Suspension Springs. C. J. Dadswell, J. E. Russell, and R. Fielding. *Engineer*, v. 196, July 10, 1953, p. 56-59.

Manufacture of laminated, coil, and torsion bar springs. Various defects which may arise and precautions taken to prevent them. Tables, graphs. 23 ref. (Q general, T7, AY)

621-Q. Equipment for Compression-Creep Tests at High Temperatures. A. E. Johnson and N. E. Frost. *Engineering*, v. 176, July 3, 1953, p. 28-29.

Equipment and its operation. Diagrams, graphs. (Q3)

622-Q. Critical-Strain Effects in Cold-Worked Wrought Aluminium and Its Alloys. W. M. Williams and R. Eborall. *Institute of Metals, Journal*, v. 81, July 1953, p. 501-512.

Effects of strain, annealing temperature, and initial grain size on the critical strains and final grain sizes. Graphs, tables. 7 ref. (Q25, J23, M27, Al)

623-Q. Some Observations on Creep and Fracture From Investigations on Lead Cable-Sheath Alloys. A. Latin. *Institute of Metals, Journal*, v. 81, July 1953, p. 529-539.

Tests, results, and theoretical concepts. Tables, graphs. 34 ref. (Q26, Q3, Pb, Sb, Te)

624-Q. A Theoretical Investigation of the Deformation Textures of Titanium. D. N. Williams and D. S. Eppelsheimer. *Institute of Metals, Journal*, v. 81, July 1953, p. 553-562.

Calnan and Clews method; shear-stress values; slip and twinning deformation; and tension, compression, and cold rolled textures. Diagrams, tables. 15 ref. (Q24, Ti)

625-Q. The Influence of Composition on the Incidence of Strain Markings in Aluminium Alloys. W. H. L. Hooper. *Institute of Metals, Journal*, v. 81, July 1953, p. 563-568.

Scope of investigation, preparation of materials, and stretching experiments. (Q24, Al)

626-Q. Investigation of the Effect of Fillet Radii on the Torsional Fatigue Strength of Marine Shafting. T. W. Bunyan and H. H. Attia. *Institution of Engineers & Shipbuilders in Scotland, Transactions*, v. 96, pt. 7, 1952-53, p. 425-483; disc., p. 483-492.

Production of test shafts, testing machine, and methods of calibration. Results of large-scale tests are compared with theoretical and small-scale test results obtained by other investigators. Supplementary tests determined the properties and structure of the test shaft material. Includes strain-hardening, penetration of the fatigue cracks, unnotched size effect, and influence of such factors as surface finish and mild understressing in unnotched torsional fatigue. Diagrams, graphs, photographs, tables. 9 ref. (Q7, CN)

627-Q. Superheater Tubes. Effect of Phosphorus on the High Temperature Properties of a 0.5% Mo Steel. M. G. Gemmill and J. D. Murray. *Iron & Steel*, v. 26, July 1953, p. 347-350.

Tables, graphs. 5 ref. (Q general, AY)

628-Q. Bending of Thin Elastic Plates of Variable Thickness. Y. C. Fung. *Journal of the Aeronautical Sciences*, v. 20, July 1953, p. 455-468.

Experiments and theory on subject. Graphs, diagrams. 16 ref. (Q5)

629-Q. These Curves Show How Section Size Influences Strength Properties of Sand Castings. W. J. Reichenecker. *Materials & Methods*, v. 38, July 1953, p. 80-81.

How proper use of curves will aid in selecting proper alloy and thickness. Diagrams. (Q23, E11, Al, Cu)

630-Q. Mechanical After-Effects. *Metal Industry*, v. 83, July 10, 1953, p. 30.

After-effects when Cu, Cu alloys, Al alloys, and steels are stressed, applied stress removed, and metals allowed to rest at room temperature. (Q25, Cu, Al, ST)

631-Q. Torsion of Anisotropic Elastic Cylinders by Forces Applied on the Lateral Surface. Harold Luxenberg. *National Bureau of Standards, Journal of Research*, v. 50, May 1953, p. 263-276.

Theoretical analysis. 12 ref. (Q1)

632-Q. Causes of Brittle Fractures in Steel. Earl R. Parker. *Petroleum Engineer*, v. 25, July 15, 1953, p. D39-D40, D42, D44, D46, D49.

Effect of temperature, structural discontinuities, and chemical composition. Photographs, graphs. 11 ref. (Q26, CN)

633-Q. Residual Compressive Stress Strengthens Brittle Materials. John O. Almen. *Product Engineering*, v. 24, July 1953, p. 189-191.

Effect of retained residual compressive stress on the ductility of the surface layer of brittle materials in reducing applied surface tensile stress. Spring test data demonstrate beneficial effect of residual compressive stress in the surface of hard steel. Diagrams. (Q23, Q28, G23, ST)

634-Q. The Plastic Instability of Plates. H. G. Hopkins. *Quarterly of Applied Mathematics*, v. 11, July 1953, p. 185-200.

Flow theory of plates under edge stresses. 7 ref. (Q24)

635-Q. On the Development of Plastic Hinges in Rigid-Plastic Beams. M. G. Salvadori and F. Dimaggio. *Quarterly of Applied Mathematics*, v. 11, July 1953, p. 223-230.

Development in beams acted upon by certain types of distributed, dynamic loads. Graphs. (Q24)

636-Q. Welded Ships. An Investigation Into the Causes of Structural Failures. *Sheet Metal Industries*, v. 30, July 1953, p. 566-570, 583.

Photographs, diagrams. (Q26, ST)

637-Q. Deformation of Single Crystals. Earl R. Parker and Jack Washburn. "Modern Research Techniques in Physical Metallurgy," American Society for Metals, Cleveland, p. 186-204.

Even slip deformation, the simplest type, is not explained on an atomic scale. Several new techniques are discussed. Acid machined single Zn crystal test method gives excellent reproducibility. (Q24, Zn)

638-Q. High Speed Strain Measurements. G. R. Irwin. "Modern Research Techniques in Physical Metallurgy," American Society for Metals, Cleveland, p. 205-224.

Several recent experiments in the plastic range of several materials. Test instruments. (Q23)

639-Q. The Metallurgical Use of Anelasticity. C. Wert. "Modern Research Techniques in Physical Metallurgy," American Society for Metals, Cleveland, p. 225-250.

Measurement and applications of anelastic data. (Q22)

640-Q. (English.) **'Third-Order' Elastic Coefficients.** R. F. S. Hearmon. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 331-340.

Definition of third-order elastic constants and some of the properties of the associated tensors. Direct enumeration of the third-order constants is made for all crystal classes and for the isotropic system. Estimates of the numerical values of certain combinations of third-order constants for Cu, Zn, and Al. Graphs, tables. 18 ref. (Q21, Cu, Zn, Al)

641-Q. (English.) **Some Observations on the Crystallography of Deformation Twins.** E. O. Hall. *Acta Crystallographica,* v. 6, June 1953, p. 570-571.

Twinning of hexagonal, tetragonal, and rhombohedral metals. Table. (Q24, M26)

642-Q. (English, Spanish.) **Combating Failure of High-Pressure Oil Pipes.** *Machinery Lloyd* (Overseas Ed.), v. 25, July 4, 1953, p. 101-104.

Types of failures, vibration frequencies, fatigue limit of pipe materials, and damping of pipes. Diagrams, tables. (Q8)

643-Q. (Dutch.) **Effect of Centrifugal Casting on Bearing Bronze.** Th. G. Köhler. *Metalen,* v. 8, no. 5, Mar. 14, 1953, p. 114-116.

Differences between sand-cast and centrifugally cast bearing bronzes from standpoint of wear resistance. Photographs, graphs, tables. (Q9, E11, E14, Cu)

644-Q. (French.) **Amsler Equipment for Fatigue Tests at High Temperature on High-Frequency Electromagnetic Pulsators (Vibrophores).** A. Tenot. *Metaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 135-140.

Functioning principle of the furnace temperature regulator. Concludes that engineers will now be able to study the behavior of high-temperature materials up to 800° C. Diagrams, photographs. (Q7)

645-Q. (French.) **Apparatus for High-Temperature Compression Testing (Up to 1800° C).** J. Culmann. *Métaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 141-142.

Diagram. (Q28)

646-Q. (French.) **Heat Resistant Materials. Creep Tests by Cantilever Bending.** G. T. Harris and H. C. Child. *Métaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 152-158.

Advantages, particularly for temperature of 1100° C. and over. Diagrams, photographs. 7 ref. (Q3)

647-Q. (French.) **Considerations on the Elasticity Coefficient and Elasticity Limit of Alumina-Aluminum Complex.** R. de Fleury. *Métaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 168-170.

5 references. (Q21, Al)

648-Q. (Russian.) **Fatigue Resistance of Babbitt in Bearings of Transport Diesel Engines.** N. A. Bushe. *Vestnik Mashinostroenita,* v. 33, no. 2, Feb. 1953, p. 5-10.

Qualities of babbitt. Inexpensive composition with better heat resistance performance. 3 ref. (Q7, Sn)

649-Q. (Swedish.) **Impact Properties of Soft Steels With Different Aluminum Content.** Ake Josefsson and Erik Nygren. *Jernkontorets Annaler,* v. 137, no. 3, 1953, p. 69-99.

Influence of increased Al content on the tendency to brittle fracture and grain size after various heat treatments. Tables, graphs, photomicrographs. 11 ref. (Q6, J general, CN)

650-Q. An Evaluation of Several Static and Dynamic Methods for Determining Elastic Moduli. John T. Richards. "Symposium on Determination of Elastic Constants", American Society for Testing Materials, Philadelphia, p. 71-98; disc., 98-100.

As a means of evaluating test methods, specimens were submitted to several laboratories and results compared. Static procedures included tension, compression, flexure, and torsion. Dynamic moduli were obtained directly by speed of sound determinations and indirectly by longitudinal, flexural, shear, and torsional vibration. Poisson's ratio was measured directly and also calculated from modulus data. An explanation of the differences on the basis of test methods and conditions is attempted. Tables, graphs. 49 ref. (Q21)

651-Q. Dynamic Methods for Determining the Elastic Constants and Their Temperature Variation in Metals. M. E. Fine. "Symposium on Determination of Elastic Constants", American Society for Testing Materials, Philadelphia, p. 43-67; disc., p. 68-70.

Introduction to the theory is given. Various methods using vibrations ranging in frequency from a fraction of a cycle to 30 megacycles per sec. are critically reviewed. Dynamic methods are capable of giving precise results and are more convenient than static measurements if the sample is small, brittle, has large creep effects, or if knowledge of the elastic constants as functions of temperature is desired. Diagrams, tables, graphs. 64 ref. (Q21)

652-Q. Report on ASTM Task Group for Determination of Elastic Constants. Walter Ramberg. "Symposium on Determination of Elastic Constants", American Society for Testing Materials, Philadelphia, p. 3-9.

Survey made to determine values of elastic constants and methods to obtain values. Graphs, tables. (Q21)

653-Q. The Influence of Temperature on the Elastic Constants of Some Commercial Steels. F. Garofalo, P. R. Malenock, and G. V. Smith. Paper from "Symposium on Determination of Elastic Constants", American Society for Testing Materials, Philadelphia, p. 10-27; disc., p. 28-30.

Elastic moduli in tension and shear were determined at various temperatures between 75 and 1500° F. for 21 commercial steels. Diagrams, tables, graphs. 20 ref. (Q23, CN, AY)

654-Q. (Book.) **High-Temperature Alloys.** C. L. Clark. 383 p. 1953. Pitman Publishing Corp., 2 W. 45th St., New York 19, N. Y. $7.50.

Summarizes present standards of knowledge of the behavior of alloys at elevated temperatures. Engineering aspects of alloy steel are emphasized. Procedures for selecting permissible working stresses, and activities of the various specifications and code writing bodies. (Q general, SG-h)

655-Q. (Book.) **Introduction to the Theory of Plasticity for Engineers.** Oscar Hoffman and George Sachs. 276 p. 1953. McGraw-Hill, New York 36, N. Y. $6.50.

Basic laws and theories necessary for understanding theory of plasticity. Concepts of stress and strain tensors. Behavior of the thick-walled spherical shell and the thick-walled tube under internal pressure, and rotating cylinders and disks, all of ideally plastic materials. (Q23)

656-Q. (Book.) **Society for Experimental Stress Analysis, Proceedings, (Annual Volume) v. 10, nos. 1 and 2, 1952.** 421 p. Society for Experimental Stress Analysis, Central Square Station, P.O. Box 168, Cambridge 39, Mass.

Consists of individual papers, separately abstracted, on various aspects of stress analysis. (Q25)

657-Q. (Book.) **Symposium on Determination of Elastic Constants.** 100 p. 1952. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Individual papers pertaining to methods for commercial steels, metals, and nonmetallic materials are abstracted separately. (Q21)

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Corrosion

278-R. Extending Hot Water Tank Life. R. L. Horst. *American Gas Association Monthly,* v. 35, June 1953, p. 10-11, 50.

Effectiveness of cathodic protection of domestic hot water heaters is evaluated in a series of tests. Graphs. (R10, CN)

279-R. A Study on Causes of Surface Damages on Ship Propellers. Engel Galtung. *American Society of Naval Engineers, Inc., Journal,* v. 65, May 1953, p. 389-399.

Damage due to contact with water. 16 ref. (R4)

280-R. Deaeration of Feed Tanks Will Minimize Boiler Tube Corrosion. *Bureau of Ships Journal,* v. 2, July 1953, p. 39-40.

Stresses the importance of operating deaerating feed tanks at proper pressures and temperatures. (R4)

281-R. Corrosion. Its Cause and Control. W. R. Thomas. *Canadian Metals,* v. 16, June 1953, p. 21-22.

Nature of corrosion processes and fundamental general principles of control. (R1)

282-R. Stainless Steels. *Chemical Engineering,* v. 60, Apr. 1953, p. 290, 292, 294, 296-298, 300; May 1953, p. 300, 302, 304-306, 308, 310, 312; June 1953, p. 302, 304, 306, 308, 310-311; July 1953, p. 262, 264, 266, 268, 270, 272.

Factors in selection of stainless steel such as operating conditions, design, and fabrication requirements. Corrosion resistance of 18-8, Mo, and 12% Cr stainless steels to a number of corrosives. Mechanical and chemical properties and applications. Tables, graphs. (R general, Q general, T29, SS)

283-R. Inhibition of Corrosion. U. R. Evans. *Chemistry & Industry,* May 30, 1953, p. 530-533.

Dry and wet oxidation; and use of oxidizing anodic, cathodic, and organic inhibitors. (R10)

284-R. Caustic Cracking in Steam Boilers. R. Rath. *Chemistry & Industry,* June 20, 1953. p. 600-603.

Use of alkaline phosphates for the protection of boiler metal in certain cases of stress corrosion. Tables. (R10, ST)

285-R. Nickel Coating Technique Minimizes Tubing Corrosion. S. S. Wilson. *Drilling,* v. 14, June 1953, p. 92, 94.

Advantages of Ni-lined pipe in combating corrosion in oil fields. (R general, L general, Ni, CN)

286-R. Oxidation of Metals at High Temperatures. Walter J. Moore. *Electrochemical Society, Journal,* v. 100, July 1953, p. 302-313.

Available data on the oxidation rates of pure metals from 300 to

1000° C. were analyzed in terms of concentrations of defects in the oxide structures and defect diffusion coefficients. Quantitative agreement with diffusion theory is obtained in the cases of p-type oxides such as Cu_2O and NiO, in which cationic vacancies arise by solution of O_2 at the oxide-oxygen interface. 61 ref. (R2, Cu, Ni)

287-R. Cathodic Protection of Steel Gas Mains. H. M. Powell. *Gas Journal*, v. 274, June 24, 1953, p. 853.

Nature and advantages of cathodic protection. (R10, CN, Mg)

288-R. Flow of Oxide Layer During Oxidation of Copper. Walter J. Moore. *Journal of Chemical Physics*, v. 21, June 1953, p. 1117.

Further data on oxidation of Cu. (R2, Cu)

289-R. Work in Great Britain on Corrosion and Deposits in Air Preheaters. A. A. Berk. *Mechanical Engineering*, v. 75, July 1953, p. 545-546.

Laboratory findings; applications of dew-point meter and dusting methods; immunity period in new boilers; and cleaning air preheaters and superheaters. (R4)

290-R. Coal Gas and Aluminium. *Metallurgia*, v. 47, no. 283, May 1953, p. 246.

Installation of an Al roof to determine suitability of Al as a structural material in gas works. Roof was tested for effects of corrosion after four years. (R9, T26, Al)

291-R. A New Concept of Heat-Checking on Brass Pressure-Casting Dies. W. R. Brown. *Metal Progress*, v. 63, June 1953. p. 73-78.

Experiments show that cause of cracking is formation of a hard and brittle intermediate layer resulting from intermetallic corrosion of the die steel by the zinc in the brass. Micrographs. (R1, Q26, Cu)

292-R. Bacteriological Control. *Oil and Gas Journal*, v. 52, June 29, 1953, p. 113.

Occurrence and control of bacterial corrosion. (R1)

293-R. War Against Corrosion. Preventing Hydrogen Attack on Steel. W. A. Bonner, H. D. Burnham, J. J. Conradi, and T. Skei. *Petroleum Processing*, v. 8. May 1953, p. 686-690; June 1953, p. 878-883.

Conditions necessary for attack to occur and practical methods for operators to detect H_2 penetration. New techniques for prevention by use of ammonium polysulfide and O_2 as inhibitors. Graphs. 14 ref. (R10, CN)

294-R. Reduce Corrosion Costs With Organic Inhibitors. C. C. Hulbert and J. A. Rippetoe, Jr. *Petroleum Refiner*, v. 32, June 1953, p. 113-118.

How to minimize maintenance in tower tops and overhead systems. Tables. (R10)

295-R. Economic Factors of Atmospheric Corrosion Versus Protection. Clarence C. Harvey. *Petroleum Refiner*, v. 32. June 1953, p. 122-124.

Economic aspects of painting programs. (R3, L26)

296-R. Corrosion for Pipeliners. IV. Testing. Starr Thaver. *Pipe Line News*. v. 25, June 1953, p. 34-37.

Methods of measuring the potential difference between protected metal and surrounding soil. (R8)

297-R. Coatings Cut Corrosion Costs. L. G. Jones. *Power Engineering*, v. 57, July 1953, p. 87-89.

Proper selection of corrosion resistant metals and metallic coatings. Tables. 4 ref.
(R general, L general, CI, Cu, Al, Zn, Pb)

298-R. Corrosion Problems in Railway Equipment. Factors in Hopper Car Design on Virginian. L. W. Doggett. *Railway Locomotives and Cars*, v. 127, July 1953, p. 55-57.

Tests on hopper-car plates made of "Cor-Ten". (R general, T23, AY)

299-R. Certain Aspects of the Galvanic Corrosion Behavior of Titanium. David Schlain. U. S. Bureau of Mines, Report of Investigations 4965, Apr. 1953, 21 p.

Results of various tests. Tables, graphs. (R1, R11, Ti)

300-R. Packaging of Wire and Wire Products. A. H. Andrews. *Wire and Wire Products*, v. 28, June 1953, p. 572, 574-575, 628-629.

Developments in packaging techniques to prevent rusting and damage. (R10)

301-R. (English.) **The Anodic Behaviour of Iron-Chromium Alloys in Sulphuric Acid Solution.** Susumu Morioka and Kazutaka Sakiyama. *Technology Reports of the Tohoku University*, v. 17, no. 2, 1953, p. 176-189.

Corrosion resistance, anodic dissolution and electropolishing of Fe-Cr alloy. Diagrams, graphs. 4 ref. (R1, L13, Fe, Cr)

302-R. (German.) **Theory of Scaling Processes on Metal Alloys.** Karl Hauffe. *Archiv für das Eisenhüttenwesen*, v. 24, no. 3-4, Mar.-Apr. 1953, p. 161-171.

Shows how formation of metal oxides, sulfides, or halides may be a diffusion phenomena. Suggestions for developing scale-resistant alloys. Graphs, diagrams. 97 ref. (R2, Ni)

303-R. (German.) **Improvement of Testing of Steel for Sensitivity to Stress-Corrosion.** Wilhelm Radeker. *Stahl und Eisen*, v. 73, no. 8, Apr. 8, 1953. p. 485-492.

Improved test using a long-duration hot tensile test in a $Ca(NO_3)_2$—NH_4NO_3 bath. Charts, photographs. 10 ref. (R1, ST)

304-R. Air-Preheater Design as Affected by Fuel Characteristics. Hilmer Karlsson and W. E. Hammond. *American Society of Mechanical Engineers, Transactions*, v. 75. July 1953, p. 711-718; disc., p. 718-722.

Equipment design to prevent corrosion and plugging. Graphs, diagrams. (R7)

305-R. Contamination of Condensate by Heat-Exchanger-Tube Alloys. J. D. Ristroph and E. B. Powell. *American Society of Mechanical Engineers, Transactions*, v. 75, July 1953, p. 729-738; disc., p. 738-745.

Results from condensate contamination studies conducted at two steam power stations. Evaluates influence of temperature of condensate, dissolved gas content, and cumulative service time on degree of metallic contamination caused by 12 alloys used in heat exchangers. Test procedures. Photographs, diagrams, tables. (R4, Cu, Ni, SS)

306-R. The Relative Effect of Traces of Hydrogen Sulfide and Sulphur Dioxide on the Corrosion of Copper. Joseph Byrne, M. D. Kahn, H. B. Kristinsson, and C. O. Maddox, Jr. *Blast Furnace and Steel Plant*, v. 41, July 1953, p. 780-781.

Experimental results indicate that traces of H_2S are highly corrosive. 4 ref. (R6, Cu)

307-R. Condensed Phosphates in the Treatment of Corrosive Waters. D. N. Parham and C. W. Tod. *Chemistry & Industry*, June 27, 1953, p. 628-631.

Chemistry of the phosphates. Use in prevention of corrosion in cold waters containing high concentrations of chloride. (R4, R5, CN)

308-R. Amines for Corrosion Prevention in Steam Condensate Systems. C. Jacklin. *Corrosion* (News Section), v. 9, July 1953, p. 1.

Advantages of morpholine. Photograph. (R4)

309-R. Examination of 335 Miles of Asphalt Mastic Coated Pipe. Donald E. Miltner. *Corrosion* (Technical Section), v. 9, July 1953, p. 210-214; disc., p. 214-215.

Methods of test employed in examination. Test results, typical coating failures found, and coating behavior with particular reference to the prolonged effect of cathodic protection. Photographs. (R10, R8)

310-R. Cathodic Protection Applied to Tank Bottoms. Scott P. Ewing and J. S. Hutchison. *Corrosion* (Technical Section), v. 9, July 1953, p. 221-231; disc., p. 231.

Laboratory studies in which method was devised for determining cathodic current requirements for protection of storage tank bottoms. Photographs, tables, graphs. 8 ref. (R10, CN)

311-R. Effects of Polarization on Telephone Cable Buried Through a Salt Bed. Daniel R. Werner. *Corrosion* (Technical Section), v. 9, July 1953, p. 232-236.

Method of cathodic protection. Diagrams, graphs. (R10, Cu, Pb, Mg)

312-R. Effect of Composition of Steel on the Performance of Organic Coatings in Atmospheric Exposure. F. L. LaQue and James A. Boylan. *Corrosion* (Technical Section), v. 9, July 1953, p. 237-241.

Common automobile paint system. Tables, photographs.
(R3, Cu, AY, CI)

313-R. Cosmetic Aerosols. R. C. Downing and E. G. Young. *Drug & Cosmetic Industry*, v. 73, July 1953, p. 32-33, 106-112.

Markets, compatibility, pressure, spray character, and corrosion. Photographs, tables. (R7, Al, Cu, ST)

314-R. Corrosion-Free Vacuum Filtration. Walter Perkins and R. O. Weiss. *Drug & Cosmetic Industry*, v. 73, July 1953, p. 44-45, 129-133.

Proper selection of filters for specific purposes. Photographs, tables. 5 ref. (R general, T29)

315-R. Detecting Internal Corrosion by Ultrasonic Inspection. I. Improved Equipment Has Made Gauge Applicable for Pipeline Work. Donald C. Erdman. *Gas*, v. 29, July 1953, p. 104, 106.

Photographs. (R11, S14, CN)

316-R. New High Temperature and Corrosion Research Projects Planned by the Alloy Casting Institute. *Industrial Heating*, v. 20, July 1953, p. 1384, 1386, 1388. 1390.

Projects planned, including efficiency at higher temperatures, alloy conservation, and high-strength corrosion resistant alloys.
(R general, SG-g, h)

317-R. Hydrogen Blisters in Brass Sheet. R. Eborall and A. J. Swain. *Institute of Metals, Journal*, v. 81, July 1953; p. 497-500.

Causes of blistering and an effective remedy. Tables. (R2, Cu)

318-R. Locating High-Resistance Joints in Underground Piping. Marshall E. Parker. *Oil and Gas Journal*, v. 52. July 20, 1953, p. 141.

Methods for locating joints so that cathodic protection can be effective. (R10)

319-R. Heat-Resistant Furnace Castings. W. L. Nelson. *Oil and Gas Journal*, v. 52. July 20, 1953, p. 143.

Classifies stainless steel castings according to their resistance to oxidizing atmospheres, presence of S, and reducing atmospheres. Tables. (R3, SS)

320-R. Estimating the Corrosivity of Crude Oils. H. A. Cataldi. R. J. Askevold, and A. E. Harnsberger. *Petroleum Refiner*, v. 32, July 1953, p. 145-150.

Studies to find accurate, reliable method for predicting crude oil corrosivity. Tables, graphs. (R7)

321-R. Corrosion for Pipeliners. V. Cathodic Protection Equipment. Starr

Thayer. *Pipe Line News,* v. 25, July 1953, p. 40, 42, 44.

Use in production equipment and tools available to the corrosion engineer. (R10, Al, CI)

322-R. Preventing Corrosion of Air Conditioning Equipment. Paul O. Blackmore. *Refrigerating Engineering,* v. 61, July 1953, p. 733-737, 788, 790, 792.

Fundamentals of corrosion and what one company is doing to prevent it. Tables, diagram, photographs. (R3, Fe, Al)

323-R. How to Put the Hex on Corrosion of Car Bodies. *SAE Journal,* v. 61, July 1953, p. 78-80.

Based on "Corrosion of Automobile Bodies" by F. L. LaQue. Corrosive medium, metal that is corroded, and ways to prevent corrosion. (R general, ST)

324-R. An Investigation of "Reticulation" on Aluminium and Light Alloys. J. Herenguel. *Sheet Metal Industries,* v. 30, July 1953, p. 591-596, 598.

Causes, prevention, and cure of minute, interconnected surface cracks on sheets. Diagrams, photographs. (R2, Al)

325-R. Recovery Operation Corrosion Problems. H. O. Teeple. *Tappi,* v. 36, July 1953, p. 127A-128A.

Corrosion of carbon and stainless steel equipment in paper mills. (R7, CN, SS)

326-R. Corrosion Control Experience in Cedar Rapids, Iowa. Arnold K. Cherry. *Water & Sewage Works,* v. 100, July 1953, p. 253-256.

Improvements in corrosion resistance of pipe lines are credited to higher pH value, phosphate treatment, and flushing program of water treating plant. Photographs. (R10, R4)

327-R. (French.) **Behavior of Materials at Temperature of Superheated Steam up to 600° C.** G. Bandel and H. J. Wiester. *Métaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 159-167.

Favorable results with use of heat resistant steels. Tables, diagrams. 9 ref. (R2, SS)

328-R. (Italian.) **Application of Electric Models to the Study of Diffusion Phenomena in Differential Aeration Corrosion.** Giuseppe Bianchi. *Metallurgia Italiana,* v. 45, no. 4, Apr. 1953, p. 123-127.

Experimental methods used. Results obtained. Graphs, diagrams. 8 ref. (R1, Zn)

329-R. (Russian.) **Regulations for the Protection of Underground Metallic Equipment From Corrosion by Stray Currents.** B. G. Lortkipanidze. *Elektrichestvo,* no. 9, Sept. 1952, p. 76-79.

Corrections, substitutions, additional ideas, and notes for the revision of a 1940 edition of "Regulations for the Protection of Underground Metallic Equipment From Damage by Stray Currents". 4 ref. (R10)

330-R. (Book.) **Temporary Prevention of Corrosion on Metal Surfaces (During Transportation and Storage).** B. S. 1133, sec. 6. 98 p. 1953. British Standards Institution, 24 Victoria St., London S.W.1, England. 10s, 6d.

Deals with available methods and establishing performance standards. (R10)

S
Inspection and Control

253-S. Construction of Filled Thermal Systems. *Canadian Chemical Processing,* v. 37, June 1953, p. 42-44, 64, 66.

Basic elements in a filled temperature control system and installation precautions. Diagrams. (S16, Cu, Pb, SS)

254-S. Surface Reactions of Steel in Dilute $Cr^{51}O_4$ Solution: Applications to Passivity. R. A. Powers and Norman Hackerman. *Electrochemical Society, Journal,* v. 100, July 1953, p. 314-319.

Interactions between a steel surface and anions containing Cr-VI were studied by radiotracer methods supplemented by contact potential measurements. (S19, R10, ST)

255-S. Precise Parts Sorting on Production Lines. Albert C. Sanford. *Electronics,* v. 26, July 1953, p. 142-145.

Electronic and electrical devices which inspect and measure parts on the assembly line and actuate the disposal units. Photographs, diagrams. (S14)

256-S. Pearlitic Malleable Castings. H. E. Steinhoff and Lyle Jenkins. *Foundry,* v. 81, July 1953, p. 84-87.

Shows that metallurgical and chemical controls and modern production methods improve product quality. Micrographs. (S general, E11, CI)

257-S. Aspects of Nuclear Fission of Interest to Foundrymen and Metallurgists. E. W. Colbeck. *Foundry Trade Journal,* v. 94, June 18, 1953, p. 697-706.

Nondestructive examination by radio-isotopes, their use as tracers in metallurgy, nuclear energy as source of power, and problems of constructional materials for atomic piles. Diagrams, photographs. 25 ref. (S19, T25)

258-S. Atlas. Steel Giant. Hugh C. McKinnon. *Instrumentation,* v. 6, 2nd qtr., 1953, p. 16-17.

Process control in high-quality steel plant. (S18, SS, TS)

259-S. Pyrometric Midgets. C. A. Volgelsang and J. D. Sine. *Instrumentation,* v. 6, 1st qtr., 1953, p. 33-36; 2nd qtr., 1953, p. 33-36.

Technique of selecting, installing, and maintaining thermocouples and extension wire. Diagrams, graphs, tables. 19 ref. (S16)

260-S. New Instrument for Roughness Measurement. A. F. Underwood and J. B. Bidwell. *Machine and Tool Blue Book,* v. 49, July 1953, p. 202-204, 206, 208-210, 212-215.

Instrument which is compact, easy to use, and extremely accurate. Diagrams, photographs. (S15)

261-S. Gamma-Ray Equipment for the Non-Destructive Examination of Casting and Welded Assemblies. *Machinery* (London), v. 82, June 19, 1953, p. 1148-1151.

Described and illustrated. (S13, E general, K general)

262-S. The Construction and Use of Mecalix Transducer Units. *Machinery* (London), v. 82, June 19, 1953, p. 1157-1161.

Unit which is used for measuring stresses and tolerances when machining. Photographs, diagrams. (S14, Q25)

263-S. Ultrasonic Measuring Instruments. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, June 1953, p. 69-71.

Means for direct measurement of wall thicknesses of nonferrous metals. Diagrams. (S14, EG-a)

264-S. Tolerances and Specifications of Gray-Iron Castings. C. O. Burgess. *Mechanical Engineering,* v. 75, July 1953, p. 547-549.

Considers specifications, as-cast tolerances, machine tolerances, and jig locations (S22, CI)

265-S. Flush Pin Gauges. *Mechanical World and Engineering Record,* v. 133, June 1953, p. 254-256.

Application will speed up the inspection of parts, particularly when the latter are produced by single spindle and multi-spindle automatics where a 100% check is demanded. (S14)

266-S. Standard Stainless Steels, Wrought and Cast. *Metal Progress,* v. 63, June 1953, p. 96B.

Tabulated information on compositions. (S22, SS)

267-S. Process Control in Gun Tube Manufacture. H. C. Dill and F. B. Stern, Jr. *Metal Progress,* v. 63, June 1953, p. 161-162.

Inspection program. (S18)

268-S. Radioisotopes in Metallurgy. *Metal Progress,* v. 63, June 1953, p. 186-188.

Digest of paper by H. R. Spedden presented at the Nuclear Science in Industry Session of the American Assoc. for the Advancement of Science, Dec. 29, 1952. Shows how isotopes are being used to study metallurgical problems. (S19)

269-S. Precautions With Precision Measurement. C. W. Kennedy. *Modern Machine Shop,* v. 26, July 1953, p. 180-182, 184, 186, 188, 190, 192, 194, 196, 198, 200.

Suggestions for use and care of precision gaging instruments. Photographs. (S14)

270-S. Measurement of Temperatures of Metal-Mould Interfaces. D. V. Atterton and D. H. Houseman. *Nature,* v. 171, May 30, 1953, p. 980-981.

Application of the method. (S16)

271-S. The Isotopic Constitution of Silicon, Germanium, and Hafnium. John H. Reynolds. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1047-1049.

Techniques measuring the constitutions with a mass spectrometer. Compares results. Tables. 5 ref. (S19)

272-S. Through Research to Standards on Cast-Iron Pipe. Thomas H. Wiggin. *Standardization,* v. 24, June 1953, p. 168-170, 184.

Development of standards on cast-iron pipe in respect to reasons for failure, corrosion, and thickness necessary. Photographs. (S22, CI)

273-S. How You Can Control Temperatures in Induction Heating. *Steel,* v. 133, July 6, 1953, p. 149.

New instrument which can detect minute changes in radiation. Its use to control and record temperature in heating applications. (S16, J2)

274-S. Analysis of Maximum Temperatures in Workpieces. A. O. Schmidt. *Tool Engineer,* v. 31, July 1953, p. 53-58.

State of workpieces with respect to sensible heat. Temperature gradient in workpieces while being milled and the existence of very high instantaneous surface temperatures during the cut were determined experimentally. Diagrams, graphs, 12 ref. (S16, G17, CN)

275-S. The Hydrostatic and Hammer Tests Applied to Pressure Vessels. *Welding Journal,* v. 32, June 1953, p. 303s-304s.

Abstracted from a survey made by the Inspection and Testing Subcommittee, Fabrication Division, Pressure Vessel Research Committee. Results of the survey. (S21)

276-S. (German.) **On Sampling During Metallurgical Testing.** Willy Oelsen. *Stahl und Eisen,* v. 73, no. 8, Apr. 8, 1953, p. 495-498.

Importance of knowing at all times just what reactions are occurring in the furnaces. 3 ref. (S12, D general)

277-S. Simplification and Some Potentialities of High Strength Heat Resisting Alloys. J. B. Meierdirks, Jr. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 425-455.

Simplified treatment of effects of alloying elements. Specifications of wrought and cast alloys. Tables, graphs. 32 ref. (S22, SG-h)

278-S. Modern Magnetic Thickness Testers. *Electroplating and Metal Spraying,* v. 6, July 1953, p. 249-253, 255.

Use of various magnetic instruments to measure coating thickness. Photographs. (S14, Ni, AY, CI)

279-S. A Permanent-Magnet Crack Detector. J. W. Walley. *Engineering,* v. 176, July 3, 1953, p. 5.

New apparatus for detecting transverse faults in ferrous components. Photographs. (S13)

280-S. Deductive Methods for Testing Engineering Materials. I.-IV. A. M. Armour. *Laboratory Practice,* v. 2, Apr. 1953, p. 175-179; May 1953, p. 236-240; June 1953, p. 306-312; July 1953, p. 368-371.

General discussion of nondestructive testing. Individual tests. Diagrams, photographs. (To be continued.) (S general)

281-S. Ultrasonic Inspection Insures Dependable Jet-Engine Parts. C. V. Garrett. *Machinery* (American), v. 59, July 1953, p. 194-201.

Method for observing transmission and reflection of high-frequency sound waves to determine internal defects in jet-engine parts. Photographs, diagrams. (S13)

282-S. The Ultrasonel Flaw Detector. *Railway Gazette,* v. 99, July 3, 1953, p. 17-18.

Equipment and its operation. Photographs. (S13)

283-S. B.I.S.R.A. Profiloscope, an Inspection Tool for Wire Drawing Dies. J. G. Wistreich. *Research,* v. 6, July 1953, p. 252-257.

Working principle and design of instrument. Diagrams, graphs. (S15, F28)

284-S. Air Gaging. A Challenge and an Answer. F. Meyer, Jr. *Steel,* v. 133, July 20, 1953, p. 108-110.

Air gage used for production inspection. Photographs, diagrams. (S14)

285-S. Radioactive Tracers in Physical Metallurgy Research. Michael B. Bever. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 278-311.

Principles, operation, and detection as applied to structural studies, diffusion measurements, and surface phenomena. (S19)

286-S. (English, Spanish.) Measurement of Linear Dimensions Using Short Electromagnetic Waves. *Machinery Lloyd (Overseas Ed.),* v. 25, July 4, 1953, p. 77, 79.

Apparatus, function, operation, and measuring procedure. Diagram. (S14)

287-S. (Dutch.) Nondestructive Testing Team ECA. L. van Ouwerkerk. *Metalen,* v. 8, no. 3, Feb. 15, 1953, p. 44-50; no. 4, Feb. 28, 1953, p. 76-79; no. 5, Mar. 14, 1953, p. 98-101; no. 7, Apr. 15, 1953, p. 158-163.

Series of articles on methods of nondestructive testing. Photographs, graphs, diagrams. (S general)

288-S. (Dutch.) Nondestructive Gravimetric Determination of Average Thickness of Electrolytic Deposits and Accuracy of Such Determination. J. H. Zaat. *Metalen,* v. 8, no. 6, Mar. 31, 1953, p. 129-135.

Determines thickness mathematically from volume increase of an electroplated object. Tables, graphs. (S14, L17)

289-S. (Dutch.) X-Ray Examination of Welds. W. J. Kaufman. *Metalen,* v. 8, no. 9, May 15, 1953, p. 193-199.

Application of radiographic inspection in preproduction research, production inspection, quality control, acceptance inspection, and welder training. Tables. 18 ref. (S13, K9)

290-S. (French.) Determination of Hydrogen in Liquid Steel. M. Dauvergne. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* v. 10, no. 5, 1953, p. 823-827.

Apparatus and method for continuous control of H. Advantages. Tables, photographs. (S11, ST)

291-S. (French.) Small Electric Furnaces With Metallic Resistances Being Able to Function at High Temperature (up to 1350° C). Erwin Pierre Jung. *Métaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 127-132.

Errors to avoid, electrical and mechanical set-up, design of heating elements, and regulation of temperature. (S16)

292-S. (Russian.) Graphic Analytical Method for Computation of Symmetrically Loaded Circular Plates. S. D. Ponomarev. *Vestnik Mashinostroeniia,* v. 33, no. 2, Feb. 1953, p. 17-27.

Method can be applied to any load distribution for plates of constant and variable thickness. Graphs. 4 ref. (S14)

293-S. (Book.) Handbook of Cast Iron Pipe. Ed. 2. 444 p. 1952. Cast Iron Pipe Research Assn., 122 S. Michigan Ave., Chicago 3, Ill. $5.

Essential dimensions and specifications for pipe, and some descriptive background on foundry practice, history, design assumptions underlying the ASA specifications, and additional information about pipelaying, flow, etc. (S22, E general)

294-S. (Book.) Modern Mass Spectrometry. G. P. Barnard. 326 p. Institute of Physics, 47 Belgrave Sq., London, S.W.1, England. 50s net.

General theory of the instrument, positive ion sources, vacuum techniques, gas flow, and applications of it in physics, chemistry, engineering, hydrocarbon analysis, molecular structure, chemical kinetics, and isotopic tracer techniques in biochemistry, geology, and nuclear chemistry. (S11)

T

Applications of Metals in Equipment

202-T Advantages of Steel Tanks as Distribution Reservoirs. C. Kenyon Wells. *American Water Works Association, Journal,* v. 45, June 1953, p. 569-579.

Construction, water-tightness, flexibility of operation, appearance, safety, maintenance, cost, and an example of successful installation. (T26, ST)

203-T. A Better Landing Gear Strut for the Boeing B-47 Bomber. *Automotive Industries,* v. 109, July 1, 1953, p. 96, 102, 104.

How Al alloy forging reduces weight, and saves time and material. Photographs. (T24, F22, Al)

204-T Aluminum Light Baffle Design Is Improved. *Bureau of Ships Journal,* v. 2, July 1953, p. 37.

By design improvement the costs of manufacturing and assembling standard 100-watt overhead light fixtures have been reduced. (T1, Al)

205-T. Custom Engineered Structures for Chemical Plant. G. H. Crase, Jr. *Canadian Chemical Processing,* v. 37, June 1, 1953, p. 36, 38-40.

Use of carbon steel, stainless steel, and Al in fabrication of chemical vessels. (T29, Al, SS, CN)

206-T. Fabricating Sheet Metal. *Canadian Metals,* v. 16, June 1953, p. 44, 46.

Sheet metal flooring, panelling, and other constructional sections and products fabricated in a modern plant. Photographs. (T26)

207-T. Field Fabrication of Storage Vessels. G. H. Crase, Jr. *Canadian Metals,* v. 16, June 1953, p. 49-50.

Assembling and erecting stainless steel and aluminum storage tanks in the field. (T26, Al, CN, SS)

208-T. Aluminum Shaking Conveyor. Harold Davis. *Coal Age,* v. 58, July 1953, p. 78-80.

The conveyor, its construction, use, economy and corrosion resistance. Photographs. (T28, R general, Al)

209-T. Engineering and Technical Problems of Atomic Power. Walter H. Zinn. *Combustion,* v. 24, June 1953, p. 49-52.

Fuel supply and probable costs, reactor types, moderator and structural materials, coolants, corrosion problems, shielding, and what has been accomplished to date in the actual production of power. Tables. (T25)

210-T. Development of Power From Atomic Energy in Canada. I. N. MacKay. *Engineering Journal,* v. 36, June 1953, p. 699-701.

Functioning of a nuclear reactor in respect to fuels, products, problems involved, and probable costs. Tables. (T25)

211-T. The Lithographic Image. Chemistry vs. Hard Metal. Norman A. Mack. *Graphic Arts Monthly,* v. 25, June 1953, p. 65-66, 68.

Pros and cons of using metal or chemical litho plates. (T9)

212-T. Piping Liquid Metal. *Heating Piping & Air Conditioning,* v. 25, July 1953, p. 112-113.

Circulation of liquid Na by electromagnetic pump through 8-in. stainless steel piping. Diagram, photographs. (T29, R6, Na, SS)

213-T. Zirconium. Elliot L. Lewis. *Light Metal Age,* v. 11, June 1953, p. 8-9.

How practical commercial production was spurred by use in atomic submarine. (T25, Zr)

214-T. Aluminum Hangar. Large Sub-Assembly Units Prefabricated. Peter Stevens. *Light Metal Age,* v. 11, June 1953, p. 10-11, 34-35.

Fabrication. Illustrations. (T26, Al)

215-T. Aluminium Cans. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, June 20, 1953, p. 73-75.

New containers designed to replace the "tin can". Diagrams. (T29, Al)

216-T. Engineering Uses of Aluminium Alloys. Some Recent Interesting Examples. *Metallurgia,* v. 47, June 1953, p. 312-314.

Uses for plate girders and cable sheathing. Welding Al. Photographs. (T26, T1, K general, Al)

217-T. Characteristics of Metals for Jet Engines. *Metal-Working,* v. 9, July 1953, p. 16-19.

Oxidation, high-temperature strength loss, and corrosion. Considers Cr-Ni and Cr steels, and Ni and Co-base alloys. Graphs. (T25, R general, Q23, SS, SG-h)

218-T. Effect of Galvanized Iron on Some Tree Seedlings. J. Hawkins and D. I. Cameron. *Nature,* v. 171, May 30, 1953, p. 977-978.

Effects of the containers used to grow seedlings. (13, Zn, CN)

219-T. Materials. George E. Evans. *Nucleonics*, v. 11, June 1953, p. 18-26.
Materials used in nuclear reactors. Includes Al, Be, Mg, Mo, Ni, Ta, Ti, V, W, Zr, 18-8 stainless steel, and Inconel "X". Photographs, tables. 129 ref. (T25, Al, Be, Mg, Mo, Ni, Ta, Ti, V, W, Zr, SS)

220-T. (German.) Bearing Equipment in the Socialized Rubber Industry. K. Platz. *Chemische Technik*, v. 5, no. 2, Feb. 1953, p. 106-107.
Substitutes for scarce bearing metals. Stone bearings are mentioned for high wear resistance. Photographs, diagrams. (T7, SG-c)

221-T. Steel in Drainage Projects. L. E. Chamberlain. *American Iron and Steel Institute, Regional Technical Meetings*, 1953, p. 33-68.
Use of steel in sheet piling for cofferdams and gates in locks and dams. Considers Fort Randall Dam project. Photographs, diagrams. (T4, ST)

222-T. Prestressed Concrete. W. O. Everling. *American Iron and Steel Institute, Regional Technical Meetings*, 1953, p. 85-102.
Steel reinforcement of prestressed concrete. Graphs, photographs. (T4, T26, ST)

223-T. The Automobile Industry. Robert Cass. *Analysts Journal*, v. 9, June 1953, p. 69-70.
Use of metals in automobiles. (T21, Cu, Ni, Al, Ti, SS)

224-T. Copper Contacts Can Be Operated Above Standard Temperature Limits. H. A. Adler and K. H. Wadleigh. *Electrical World*, v. 140, July 27, 1953, p. 96-98.
Results of 18-month continuous test of bolted joints on Cu bus bars and lugs pressed on Cu rods and cables. (T1, K13, Cu, Ag, Sn, AY, ST)

225-T. Basic Principles to Support Aluminum and Copper Buses. Morris Brenner. *Electrical World*, v. 140, July 27, 1953, p. 118-119.
Support arrangements. Photographs, diagram. (T21, Cu, Al)

226-T. Aluminum Tubing in Instrument Air Connections. D. W. Humphrey. *Modern Metals*, v. 9, July 1953, p. 62, 64-65.
Tubing installation; joining techniques including soldering, pressure welding, and use of resins; corrosion prevention; and cost compared with cost of Cu. Photographs. (T8, K general, R10, Al)

227-T. A Steel Picture-Tube for Television Reception. J. de Gier, R. Hagenberg, H. J. Meerkamp Van Embden, J. A. M. Smelt, and O. L. van Steenis. *Philips Technical Review*, v. 14, Apr. 1953, p. 281-291.
Brief history of metal discharge tubes. Development of a tube with steel cone and window of new glass. Diagrams, photographs. 12 ref. (T9, Cu, SS, Pb, CN)

228-T. The Use of Coil Tinplate in the Production of Condensed Milk Cans. *Sheet Metal Industries*, v. 30, July 1953, p. 549-551.
Apparatus and procedure. Diagrams, photographs. (T29, Sn, CN)

229-T. Rynalloy Developed as Heat, Corrosion Resistant Cast Alloy for Aircraft. Wilson G. Hubbell. *Western Metals*, v. 11, July 1953, p. 68-69.
Use of Ni alloy for ball-and-socket joints. Photographs. (T24, R general, Ni)

230-T. Huge Steel Dock Static Test Facility for Navy Planes Built by Convair. *Western Metals*, v. 11, July 1953, p. 70.
Equipment for testing structural features of Navy flying boats. (T26, ST)

231-T. Aluminum Sheathed Cables. P. J. Croft. *Wire and Wire Products*, v. 28, July 1953, p. 682-687, 725.
History of Al sheathing for cables. Fields of application. Tables, graphs. (T1, Al)

232-T. (Dutch.) Metals to be Used at High Temperatures in the Electric Furnace. C. H. Luiten. *Smit Medelinyen*, v. 8, no. 1, Jan.-Mar. 1953, p. 29-34.
Specific properties of heat resistant alloys which are of practical importance for applications in electric furnaces. Particular attention is paid to the attack at high temperatures by fluxes, heat treatment salts, liquid metals, metal oxides, and different gas atmospheres. Some preventive measures. Graphs, table, photographs. (T5, R6, Cr, Ni, CN, AY)

233-T. (Book.) Manual for the Design of Ferrous and Non-Ferrous Pressure Vessels and Tanks. Ed. 4. Karl Siemon. 284 p. 1952. Edward Brothers, Ann Arbor, Mich. $3.85.
Part 1: Properties and fabricating characteristics of the principal ferrous and nonferrous metals. Part 2: A detailed treatment of the design of pressure vessels and tanks. (T26)

V. Materials
General Coverage of Specific Materials

81-V. Nickel and Its Alloys. Fabrication Process Used. D. R. Stewart. *Australasian Engineer*, April 7, 1953, p. 66-71.
Heating; forging; annealing; age hardening; joining; arc, oxyacetylene, atomic hydrogen, and resistance welding; soldering; riveting; cold working methods; deep drawing; spinning; machining; precision grinding; shearing; pickling; and thermal cutting. (Ni)

82-V Nickel and Its Alloys. Properties of Materials. W. G. Wright. *Australasian Engineer*, April 7, 1953, p. 71-74.
Various Ni alloys for low and high-temperature applications. Tables. (T general, Ni)

83-V. New Stainless Alloy Fills Long Industry Need. N. F. Mott. *Iron Age*, v. 171, June 18, 1953, p. 149-153.
The new V2B is a hardenable 18-8 stainless alloy containing Cu, Mo, Si, and a small amount of Be. Corrosion resistance, handenability, and machinability. Tables, micrographs. (R general, J28, G17, SS)

84-V. Spheroidal Graphite Cast Iron. Potentialities for the Machine Tool and General Engineering Industries. A. B. Everest. *Machinery* (London), v. 82, June 19, 1953, p. 1166-1172.
Mechanical properties, production economy, machinability, wear resistance, heat treatable types, weldability, and applications. Photographs. (CI)

85-V. How Precious Are the Precious Metals? John M. West. *Metallurgia*, v. 47, June 1953, p. 288–290.
Origins and growth of the Au standard; properties of Au and Ag alloys; and a suggested Ti standard. (Au, Ag, Ti, EG-c)

86-V. Economic Utilization of Copper-Base Alloys. *Metal Industry*, v. 82, June 19, 1953, p. 499-501.
Economy in Cu-base alloys to the foundrymen and user. Properties obtainable in casting and choice of alloy for service. (Cu)

87-V. Thorium. L. Sanderson. *Canadian Mining Journal*, v. 74, July 1953, p. 68-69.
Distribution, properties, radio-
(*Continued on p. 45*)

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PHYSICAL or INORGANIC CHEMIST: Ph.D. or M.S. degree, to be group leader in research project on halogen compounds of refractory metals. Experience with controlled atmospheres and vacuum technology desirable. Please send resume of qualifications, experience and salary expected to: The Secretary, Metals Processing Laboratory, Room 35-316, Massachusetts Institute of Technology, Cambridge 39, Mass.

METALLURGICAL ENGINEER: For work in nonferrous processing plant in southeast Pennsylvania. Experience in fabrication of nonferrous alloys with thorough knowledge of ingot casting, hot rolling, annealing and extrusion desired. For metallurgical control work and development of process procedures. Good opportunity for young man to work in correlation of laboratory developments and mill processing with growing company. Write details of education, experience and salary requirements. Box 9-5.

PHYSICAL METALLURGIST: Research department of the New Jersey Zinc Co. requires a physical metallurgist interested in research and development work on nonferrous alloys. Prefer man with advanced academic training or up to 10 years experience in theoretical and practical physical metallurgy. Clean, attractive community. Give full details, references and expected salary in first letter. Write: Research Dept. New Jersey Zinc Co., Palmerton, Pa.

TECHNICAL REPRESENTATIVE: Well-established growing firm in welding accessory field offers challenging opportunity for man, 25 to 35, with some knowledge of metallurgy and welding. Position requires travel on a nation-wide basis 50% of the time, calling on existing accounts. Salary and liberal expenses. Submit resume to: Box 9-10.

PATENT ATTORNEY or AGENT: For handling a variety of matters in patent department of large corporation having chemical and metallurgical activities and having main offices in New York. Should have general experience in patents, particularly in preparation and prosecution of applications, appeals and interferences, preferably with engineering education and training in chemistry or metallurgy. Permanent position with good opportunities. Please give full information, including legal and technical education, age, marital status, year and state in which admitted to bar, and experience and salary desired. Box 9-15.

METALLURGIST: Under 35. Technical graduate or equivalent in metallurgy or chemistry. For supervision of general heat treating specifications, high-speed steel, material analysis, cast iron and nonferrous. Box 9-20.

SALES: Young man with metallurgical engineering background interested in sales. Some sales experience in or sales engineering contact preferred. Moderate travel. Eastern Pennsylvania. Send outline of qualifications, education and salary desired. Box 9-25.

PHYSICAL METALLURGIST: B.S. or M.S. degree in metallurgy. Research and development work of nonferrous alloys. Salary open. Located in vicinity of Boston. Box 9-30.

RESEARCH AND DEVELOPMENT: Metallurgist or physical chemist to work with abrasive company on new products. Preferably some knowledge of powder metallurgy. Recent graduate with B.S. or M.S. degree. Write: Norton Co., Worcester, Mass.

Midwest

GAS AND COMBUSTION ENGINEER: Large manufacturer has opportunity for graduate engineer, age 30-45, with majors in engineering, chemistry, combustion and thermodynamics. Should have experience in heat treating, design and engineering of gas circuits including oxygen, acetylene, propane and natural gas. To take charge of engineering and designing of flame hardening equipment. Salary open. Please send resume of personal data, education and experience. Box 9-35.

ENGINEER: College engineer graduate, preferably with mechanical engineering degree, required for experimental design and

stress analysis work by large manufacturer of power transmission equipment. Some background in design work and operation of instruments desirable. Opportunity for advancement. All replies confidential. Box 9-40.

PRODUCTION METALLURGIST: Preferably with experience in jet engine manufacture. Must be capable of handling production problems relative to forging, heat treating and machining. College graduate preferred. State salary, date available, and experience in application. Box 9-45.

MANUFACTURERS REPRESENTATIVES: Low-frequency induction heating manufacturer has requirement for representative to handle products in the Chicago-Milwaukee area, and for Detroit-Lower Michigan area. Prefer man with electrical engineering background now selling induction heating or other types of furnaces. Box 9-50.

PRODUCTION EXECUTIVE: Man experienced in production of sintered metal powder parts to take charge of production. Must be willing to relocate and capable of developing an efficient powder metal fabricating operation. Prefer man with experience in bearings and structural parts. Box 9-55.

WELDING SUPERVISOR: Technically and practically qualified. Foundry experience desirable. Excellent opportunity with well-established organization. All replies confidential. Box 9-60.

METALLURGIST: Graduate. Some experience preferred but not necessary for position in steel producing plant making steel wire. Plant located in western New York State area. Give details of background and salary desired in reply. Box 9-65.

FOUNDRY ENGINEER: Mechanical engineer with some foundry experience preferred. To assist foundry superintendent and do plant engineering, with capacity for greater future responsibility. Medium-sized, progressive foundry company. Box 9-70.

SALES ENGINEER: Mechanical or metallurgical, to sell high-quality iron castings. Some experience preferred but not necessary, with capacity for greater future responsibility. Medium-sized, progressive foundry company. Box 9-75.

STEEL SALESMAN: Position for man 21 to 35 years of age with metallurgical or engineering experience to sell alloy and tool-steel for AAA-1 concern in southern Ohio, West Virginia and eastern Kentucky. Salary and expenses. Write qualifications, references and salary expected. Box 9-135.

West

WELDING ENGINEERS: Two responsible positions for outstanding men to do fundamental and applied research work in inert gas welding, resistance welding and mechanical aspects of joining, and in soldering, brazing and gas welding. Several years experience in welding research would be an asset. Living conditions excellent and salaries commensurate with ability. Send details of scholastic and industrial experience to: Joining Dept., Division of Metallurgical Research, Kaiser Aluminum & Chemical Corp., P.O. Box 1451, Spokane, Wash.

POSITIONS WANTED

METALLURGICAL ENGINEER: Age 27, married, children. Registered professional engineer. Four years experience in materials specification, corrosion, elevated temperature and fabrication of process equipment. Three years teaching physical metallurgy. One year purchasing and expediting experience. Some legal training. Desires opportunity in sales or position leading to administration. Box 9-80.

PLANT METALLURGIST: B.S. degree, age 43, married. Solid background in physical metallurgy. Extensive experience in control of nonferrous mill and foundry products, trouble shooting, and laboratory work. Capable of writing clear, concise reports and specifications. Ability to organize laboratory and execute well-planned metallurgical program. Locate anywhere in United States. Box 9-85.

METALLURGICAL ENGINEER: B.S. degree, age 26, married, veteran. Four years experience including heat treating, forging, welding, material specifications, product investigation, manufacture of hot-formed helical and elliptic springs, and trouble shooting for all types of commercial steels. Desires responsible position with opportunity. Midwest or western firm preferred. Box 9-90.

METALLURGICAL ENGINEER: B.S. in metallurgical engineering. Ten years diversified experience. Excellent background in stainless steel and copper alloys. Good knowledge of engineering steels and high-temperature alloys. Well versed in fabrication, welding, heat treating, metallography, and physical testing. Outstanding record in research and

development. Excellent technical writer. Interested in responsible position. Will relocate. Box 9-95.

METALLURGICAL ENGINEER: B.S. degree, graduate work, age 34, married, children. Ten years ferrous experience, steel mill and varied manufacturing, including metallurgical control, manufacturing and service problems, vendor and customer contact, military specifications, research and development, supervision. Desires responsible and challenging position in the East, preferably New York, Connecticut or New Jersey. Box 9-100.

METALLURGIST: B.S. degree, age 30. Desires position in metallurgy or production metallurgy in Detroit area. Four years diversified experience in shop and laboratory. Desires responsible position with opportunities for gaining experience and advancement. Box 9-105.

METALLURGIST: Production, research or sales. B.S. degree, age 42. Twenty years diversified experience in all phases of manufacture, processing, fabrication and sales engineering of alloy and specialty steels, including 12 years with corrosion and heat resisting grades. Outstanding record of accomplishment. Proven administrative ability, technical writer and consultant. Wide knowledge of quality control methods. Desires responsible and challenging position. Box 9-110.

METALLURGICAL ENGINEER: B.S. degree, some graduate study. Age 33, married. Three years research background in ordnance problems and titanium development, five years previous experience as machinist. Capable of outlining and following through developmental programs. Desires responsible position in production or research capacity with industrial firm in East. Box 9-115.

METALLURGICAL ENGINEER: Professor of metallurgy in large university desires to become affiliated with metallurgical industry in administrative, organization, customer contact, or product development capacity. Good record of professional training, administrative experience, publications and references can be furnished. Box 9-120.

PHYSICAL METALLURGIST: Sc.D. degree, age 33. Eleven years diversified experience in research and development of low carbon steels, alloy steels, nonferrous and heat resisting alloys. Desires supervisory research position in industry producing or fabricating new or special metals and alloys. Prefer Michigan-Ohio area. Box 9-140.

(*continued from page 42*)

activity, concentration, extraction, compounds, and industrial uses. (Th)

88-V. New Metals. Nathaniel Arbiter. *Engineering and Mining Journal*, v. 154, July 1953, p. 94-99.

Alkali metals, alkaline earths, trivalent elements and Group Four metals. General evaluation. (A general, EG-e, f)

89-V. Economic Utilization of Copper-Base Alloys. Report of Sub-Committee T.S. 38 of the I.B.F. Technical Council. F. C. Evans, chairman. *Foundry Trade Journal*, v. 95, July 9, 1953, p. 41-48.

Properties obtainable in Cu-base castings. Utilization, strength, and standardization. Tables. (Q general, T general, S22, Cu)

90-V. Selection of Engineering Materials. Non-Ferrous Metals. S. C. Churchill. *Machinery* (London), v. 83, July 3, 1953, p. 19-23.

Brasses, bronzes, Ni, Al, and Mg alloys. Effect of quantity on choice of production method. Photographs. (Cu, Ni, Al, Mg)

91-V. Manganese Steels. *Materials & Methods*, v. 38, July 1953, p. 105.

Tabulated data on composition, physical and mechanical properties, thermal treatment, fabricating properties, corrosion resistance, available forms, and uses. (AY)

92-V. (Dutch.) **Copper and Copper Alloys. X. Beryllium-Copper.** W. G. R. DeJager. *Metalen*, v. 8, no. 3, Feb. 15, 1953, p. 55-57; no. 5, Mar. 14, 1953, p. 101-102.

Corrosive, electrical, and mechanical properties of Be-Cu alloys. Tables, graphs. (R general, P15, Q general, Cu)

93-V. (Russian.) **Gallium.** G. Vagner and B. Gitzen. *Uspekhi Khimii*, v. 22, no. 1, Jan. 1953, p. 106-114.

Physical properties and possible uses of Ga. 39 ref. (P general, Q general, T general, Ga)

94-V. (Book.) **Boron Steel. 2nd Rev. Ed.** Ernest E. Thum, editor. 111 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $1.00.

Consists of 17 articles most of which have previously appeared in *Metal Progress*. (AY)

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